

Te Rereatukahia at SH2

29 June 2018

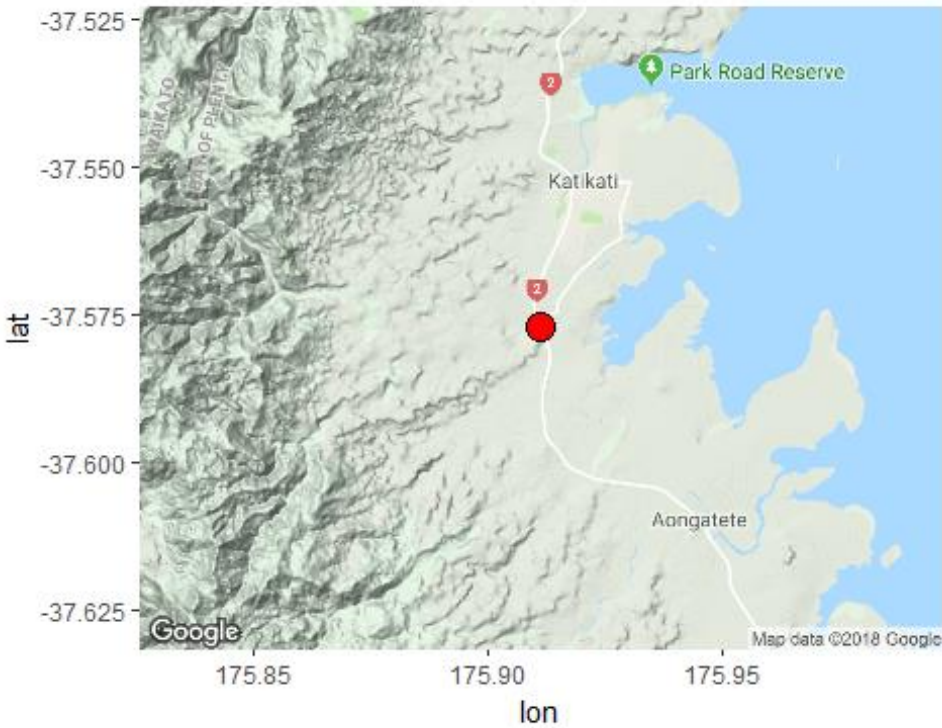


Figure 1. Map showing the location of the site.

Table 1. Site metadata.

Aquarius ID:	BQ708712	Labstar ID:	BOP710025
LAWA ID:	EBOP-00027	REC Reach:	4000415
Easting:	1857084	Northing:	5837121
Longitude:	175.91119	Latitude:	-37.57709
Parent Catchment:	Tauranga Harbour	Biophysical Unit:	VA/Steep
Elevation:	9m	Water Level:	No
Flow:	Yes	Automated:	No

Summary Statistics

Table 2. Summary statistics calculated from all available data.

Variable	n	Min	Max	Mean	Median	Perc_95 th	Perc_5t h	StDev	SE
Ammoniacal N (g/m ³)	105	-0.001	0.184	0.012	0.006	0.032	0.001	0.023	0.002
Conductivity (mS/cm)	105	0.040	0.100	0.069	0.069	0.081	0.058	0.009	0.001
Dis Oxygen Sat (%)	73	83.800	138.000	104.000	104.000	115.000	95.800	7.060	0.826
DRP (g/m ³)	104	0.000	0.062	0.008	0.006	0.021	0.003	0.008	0.001
E coli (cfu/100ml)	94	3.000	33000.000	729.000	115.000	1730.000	16.200	3540.000	365.000
N (Tot) (g/m ³)	82	0.094	1.290	0.405	0.398	0.706	0.169	0.188	0.021
Nitrite Nitrate (as N) (g/m ³)	92	0.018	0.814	0.329	0.320	0.653	0.074	0.176	0.018
O2 (Dis) (g/m ³)	97	7.730	13.600	10.500	10.500	11.900	9.250	0.904	0.092
P (Tot) (g/m ³)	102	0.001	0.330	0.021	0.012	0.050	0.007	0.039	0.004
pH (pH Units)	102	6.270	7.800	7.160	7.120	7.570	6.790	0.279	0.028
Tot Susp Sed (g/m ³)	104	-0.375	77.000	3.060	0.790	8.770	0.200	10.000	0.983
Turbidity (NTU)	93	0.280	61.000	1.810	0.500	3.000	0.300	6.770	0.702
Water Clarity (m)	58	0.930	10.500	5.050	5.090	8.260	1.850	2.070	0.272
Water Temp (°C)	180	0.000	22.500	13.600	13.900	20.400	0.000	5.620	0.419

State of the Site

Comparison Plots

These figures show how the site compares to the distribution of data from other sites with the same biophysical unit classification. They are designed to provide quick, easy to understand information about comparative state. However, site assessment should not rely on this information alone. In the case where sites are missing a biophysical unit, data has been assessed against a pool of all NERMN sites.

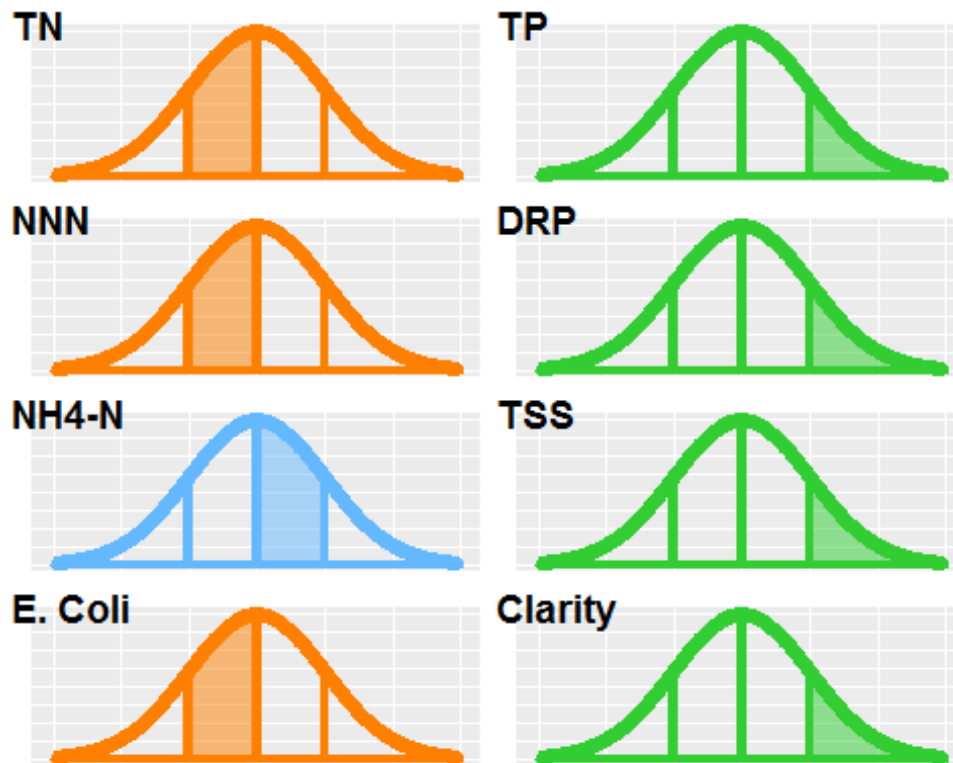


Figure 2. Comparison of the subject site against sites of a similar biophysical nature.

NOF Assessment

Tables 3, 4, and 5 contain information about how the site compared to the National Objectives Framework, part of the National Policy Statement for Freshwater Management (2014). Please refer to this document for more information about these attributes.

Table 3. Assessment against the Ammonia (Toxicity) attribute.

Timeframe	Start	End	n	Median	Maximum	Band
1 Year	2017-04-18	2018-04-18	21	0.002	0.003	A
5 Years	2013-04-19	2018-04-18	74	0.002	0.010	A
10 Years	2008-04-20	2018-04-18	84	0.002	0.012	A
All	1990-11-02	2018-04-18	102	0.003	0.043	A

Table 4. Assessment against the Nitrate (Toxicity) attribute.

Timeframe	Start	End	n	Median	Perc_95th	Band
1 Year	2017-04-18	2018-04-18	21	0.390	0.540	A
5 Years	2013-04-19	2018-04-18	74	0.320	0.630	A
10 Years	2008-04-20	2018-04-18	84	0.330	0.650	A
All	2007-08-09	2018-04-18	92	0.320	0.650	A

Table 5. Assessment against the Escherichia coli (human health for recreation) attribute.

Timeframe	Start	End	n	Exc_540	Exc_260	Median	Perc_95th	Band	Swimmable
5 Years	2013-04-19	2018-04-18	74	9.5	14.9	110	1735	Orange	Not Swimmable

Surveillance, alert, and action levels for freshwater.

Table 6 contains information about how the site ranks against the ‘Surveillance, alert, and action level’ framework for freshwater, part of the Microbiological Guidelines for Freshwaters (2003). This framework is designed to inform the public of the bathing risk at a particular site, based on the results of a single water quality sample. Although many of BoPRC’s water quality monitoring sites are not specifically valued for swimming purposes, this framework can provide a useful indicator of the extent and frequency of faecal contamination that may pose a risk to human health.

The three tier system used in this framework is as follows:

- **Surveillance (Green):** Under the surveillance condition, beaches graded Good, Fair or Poor have the potential to be affected by faecal contamination events, and routine monitoring must continue
- **Alert (Amber):** The alert mode is triggered when a single bacteriological sample exceeds a predetermined value. Under alert mode, sampling frequency should be increased to daily (for bathing sites), and catchment assessment data referred to for potential faecal sources.
- **Action (Red):** The action mode is triggered when a single sample exceeds a predetermined value. Under the action mode, the local authority and health authorities warn the public, using appropriate methods, that the beach is unsuitable for recreation and arrange for the local authority to erect signs at the beach warning the public of a health danger.

Data is summarised into three periods: 5 years, 10 years, and all available data. The overall percentage of samples that fit into each category, for each period, are calculated on the right of the table. You can gain an understanding of the prevalence of faecal contamination by comparing the percentage of samples that fall into each category, across time periods.

Table 6. Surveillance, alert, and action levels for freshwater

Timeframe	Start	End	n	Median	Perc_95th	Perc_Green	Perc_Amber	Perc_Red
5 Years	2013-04-19	2018-04-18	74	110	1780	85.1	5.4	9.5
10 Years	2008-04-20	2018-04-18	85	110	1725	83.5	5.9	10.6
All	2007-08-09	2018-04-18	94	115	1780	81.9	7.4	10.6

Time Series Plots

The Figure 3 shows timeseries plots for eight different parameters, pertaining to ecological and human health values. Data are presented on a time-scale according to the longest data record, and N and P species are on the same y axis scale.

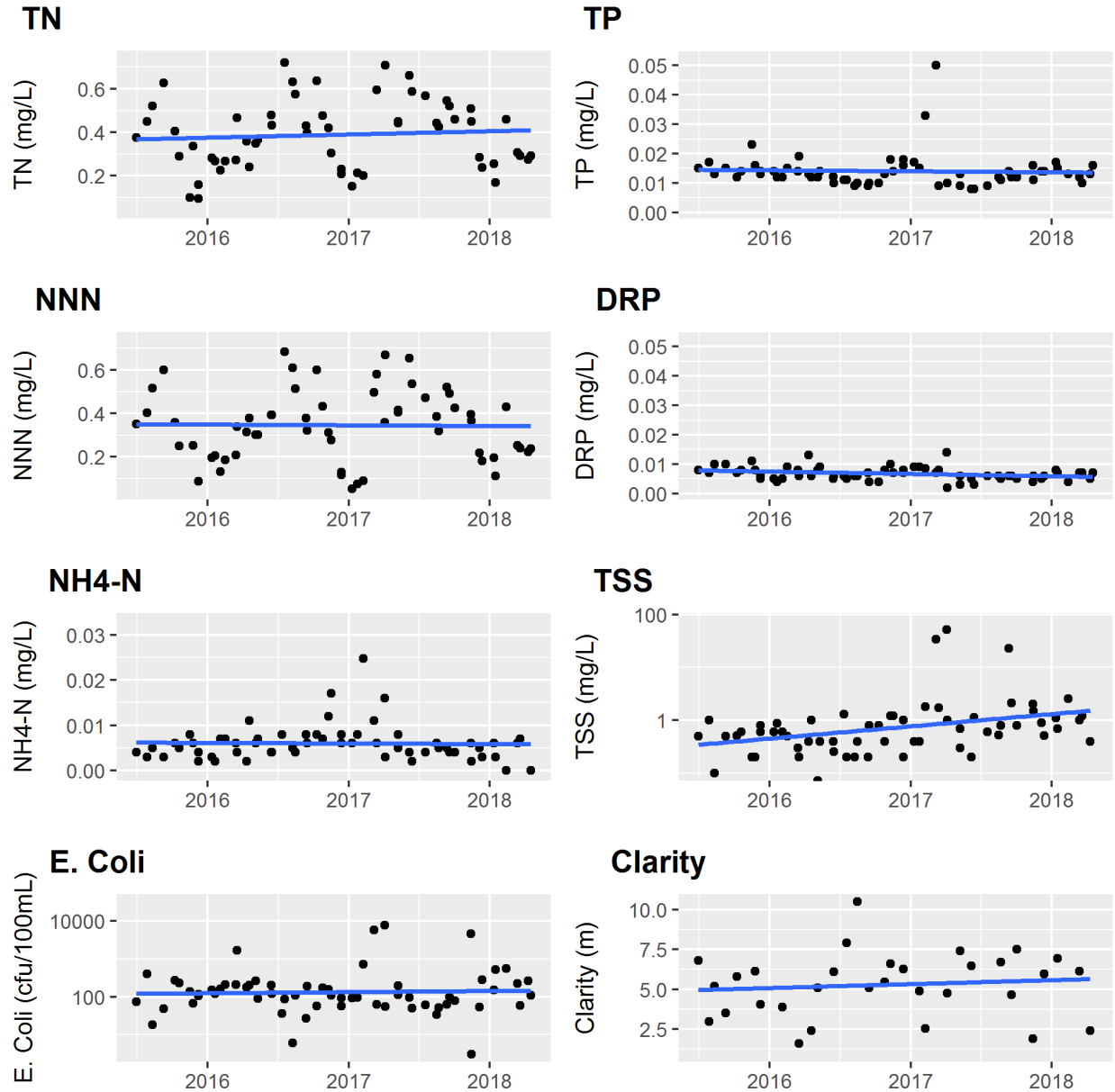


Figure 3. Time series of data for eight different parameters. The blue line represents a linear regression model.

Trend Analysis

Table 7 presents trend analysis data for each parameter presented in Figure 3. Significant trends are those where the $P < 0.05$ and the 95% confidence interval of the sen slope does not include zero. Significant trends have been split into four categories depending on the percent annual change (PAC) value. Trends with a PAC greater than 1% per annum have been classed as either 'Improving 2' or 'Degrading 2'. Trends that have a PAC between 0% and 1% have been classed as 'Improving 1' or 'Degrading 1'. The 1% threshold is arbitrary, but implies that significant trends with greater PAC values are more important than those less than 1%.

Table 7. Trend statistics for the subject site.

Parameter	Timeframe	Start	End	Sen_Slope	PAC	P_Value	Trend
TN	5 Years	2013-04-19	2018-04-18	NA	NA	NA	NA
TN	10 Years	2008-04-20	2018-04-18	NA	NA	NA	NA
TN	All	2015-06-30	2018-04-18	0.0636	15.33	0.28	No Trend
NNN	5 Years	2013-04-19	2018-04-18	NA	NA	NA	NA
NNN	10 Years	2008-04-20	2018-04-18	NA	NA	NA	NA
NNN	All	2015-06-30	2018-04-18	0.0658	18.73	0.28	No Trend
NH4N	5 Years	2013-04-19	2018-04-18	NA	NA	NA	NA
NH4N	10 Years	2008-04-20	2018-04-18	NA	NA	NA	NA
NH4N	All	2015-06-30	2018-04-18	0.0001	2.50	1.00	No Trend
TP	5 Years	2013-04-19	2018-04-18	NA	NA	NA	NA
TP	10 Years	2008-04-20	2018-04-18	NA	NA	NA	NA
TP	All	2015-06-30	2018-04-18	-0.0018	-13.46	0.12	No Trend
DRP	5 Years	2013-04-19	2018-04-18	NA	NA	NA	NA
DRP	10 Years	2008-04-20	2018-04-18	NA	NA	NA	NA
DRP	All	2015-06-30	2018-04-18	-0.0015	-21.43	<0.01	Improving 2
ECOLI	5 Years	2013-04-19	2018-04-18	NA	NA	NA	NA
ECOLI	10 Years	2008-04-20	2018-04-18	NA	NA	NA	NA
ECOLI	All	2015-06-30	2018-04-18	0.0334	0.70	0.88	No Trend
TSS	5 Years	2013-04-19	2018-04-18	NA	NA	NA	NA
TSS	10 Years	2008-04-20	2018-04-18	NA	NA	NA	NA

Parameter	Timeframe	Start	End	Sen_Slope	PAC	P_Value	Trend
TSS	All	2015-06-30	2018-04-18	0.2000	30.31	<0.05	Degrading 2
CLARITY	5 Years	2013-04-13	2018-04-12	NA	NA	NA	NA
CLARITY	10 Years	2008-04-14	2018-04-12	NA	NA	NA	NA
CLARITY	All	2013-07-10	2018-04-12	0.2833	4.91	0.33	No Trend