

Site 013 – Sams Creek, Mount Kuring-gai

Freshwater site

Berowra Creek Catchment

Monitoring Program Timelines

Program Name (site reference)	Sampling Period	Sampling Frequency
Long-term (013)	Oct 1994 – Jun 2016	Fortnightly
	Jul 2016 – Sept 2017	Monthly
Industrial (013)	Oct 2017 ongoing	Monthly

Key Findings and Recommendations

Condition	<p>Phys-chem: pH is elevated and consistently exceeds REHVs. DO is slightly suppressed only complying with REHVs approximately 50% of the time.</p> <p>Clarity: Turbidity and TSS are low and generally compliant with REHVs. Long-term decreasing trend with particular improvement evident after 2012.</p> <p>Nutrients: Nutrients are elevated and consistently exceed REHVs despite a long-term decrease, particularly in TP.</p> <p>Bacteria: Bacteria levels are slightly elevated and exceed REHVs around 50% of the time despite a long-term decreasing trend. A reduction in data variability evident after 2008.</p>
Issues	<ul style="list-style-type: none"> – Strongly influenced by industrial development in the catchment – Potential impacts from wastewater infrastructure – Difficulty in meeting REHVs in highly modified catchments
Recommendations	<ul style="list-style-type: none"> – Investigate sources of nutrients and bacteria in the catchment – Identify further opportunities for WSUD in the catchment – Ongoing collaboration with Sydney Water to improve the management of wastewater – Collaboration with State Government agencies (i.e. EPA) to improve the management of industrial developments – Engage with industry to identify opportunities to reduce sources of pollutants – Review water quality values and objectives relevant to industrial sites and continue monitoring until objectives are achieved – Maintain high sediment and erosion control standards

Site Photos



Sams Creek looking downstream during low flow



Sams Creek looking upstream during low flow

Results of Data Analysis

Table 1 Results of non-conformance calculations and *Kendall Tau* ($p < 0.05$) trend analysis for Site 013

013	REHV	Long-term				2012-2017			
		n	Median	%NCs	Trend	n	Median	%NCs	Trend
Temp (°C)	NA	496	16.74	NA	NS	102	16.42	NA	NS
pH	4.8-7	494	7.23	81	↓	101	7.24	90	NS
DO (%sat)	75-118	457	80.90	42	↓	102	73.75	52	NS
EC (mS/cm)	0.32	495	0.30	37	NS	102	0.29	28	NS
Turbidity (NTU)	8	496	6.9	45	↓	102	3.3	21	NS
TSS (mg/L)	7	507	4	35	↓	102	2	16	NS
TP (mg/L)	0.01	507	0.051	97	↓	102	0.030	100	↓
TN (mg/L)	0.32	507	0.610	90	↓	102	0.460	75	NS
NH ₃ -N (mg/L)	0.02	507	0.050	74	↓	102	0.040	71	↓
NO _x -N (mg/L)	0.05	507	0.200	85	↓	102	0.140	81	NS
F.Cols (CFU/100ml)	150	507	410	69	↓	102	210	56	NS

REHV – Regional Environmental Health Value

n - Number of sampling events

%NCs - percent non-conformance based on REHVs

NA - No associated REHV or benchmark value

NS - trend not significant based on Kendall Tau analysis at $p < 0.05$

↑ - significant increasing trend based on Kendall Tau at $p < 0.05$

↓ - significant decreasing trend based on Kendall Tau at $p < 0.05$

Median	%NCs
Within or below REHV	<25%
Equal to REHV	25% to 75%
Outside or above REHV	>75%
No associated REHV	Not Applicable

Table 2 Descriptive statistics for variables measured at Site 013 from January 1995 to September 2017

Variable	Valid n	Mean	Median	Minimum	Maximum	20 th Percentile	80 th Percentile	Std Dev
Temp (°C)	496	16.52	16.74	7.54	28.00	12.52	20.32	4.000
pH	494	7.28	7.23	4.05	11.00	7.01	7.48	0.400
DO (mg/L)	492	7.97	8.16	0.20	18.00	6.14	9.80	2.500
DO (%sat)	457	78.98	80.90	2.00	200.00	61.00	98.10	25.000
EC (mS/cm)	495	0.32	0.30	0.00	8.00	0.20	0.40	0.400
EC (µS/cm)	196	292.66	292.00	48.00	2840.00	217.00	340.00	201.300
Turbidity (NTU)	496	30.8	6.9	0.0	800.0	2.5	24.0	86.50
TSS (mg/L)	507	32	4	1	5460	1	14	257.7
TP (mg/L)	507	0.630	0.051	0.003	93.000	0.027	0.150	4.6000
TN (mg/L)	507	1.170	0.610	0.080	92.000	0.400	1.140	4.3000
NH ₃ -N (mg/L)	507	0.390	0.050	0.005	74.000	0.020	0.150	3.4000
NO _x -N (mg/L)	507	0.270	0.200	0.005	2.000	0.080	0.400	0.3000
F.Cols (CFU/100ml)	507	26766	410	1	7000000	70	3600	320485.0
E.Coli (CFU/100ml)	25	537	110	1	7800	26	450	1553.8
Enterococci (CFU/100ml)	45	644	210	2	9000	43	600	1513.9

Boxplots showing annual variability for each variable measured



