



CTENVIRONMENTAL

ECOSYSTEM MANAGEMENT AND MONITORING



November 2022 Biannual Aquatic Ecosystem Monitoring Report

Liverpool City Council

January 2023

Project	Liverpool Aquatic Ecosystem Monitoring 2021 - 2022
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Report Structure

This report presents the November Aquatic Ecosystem Monitoring Monthly Progress Report (Part 1) which is accompanied by the second biannual report (June 2022 to November 2022).

Part 1

Aquatic Ecosystem Monitoring Monthly Progress Report - November 2022

November 2022 aquatic ecosystem monitoring of the Georges River and South Creek catchments was conducted on November 18, 2022.

Prior to this report, Liverpool City Council expressed concerns about the water quality at Wattle Grove (WG) a tributary of ANZAC Creek. In the first half of 2022 (January to May), water quality at WG was characterised by low dissolved oxygen and high nutrient concentrations and electrical conductivity. In the second half of 2022 (June to November), whilst there was a noticeable improvement in dissolved oxygen levels, nutrient and electrical conductivity were variable and elevated at times.

This report provides a summary of recreation water quality indicators (Cyanobacteria, *Enterococci* and *Faecal Coliforms*) at Georges River recreation monitoring sites and observations from freshwater monitoring sites. AC1 was not sampled in November 2022, as access was restricted due to construction activities.

Badgerys Creek weather monitoring station is expected to be representative of weather conditions in the Kemps Creek catchment and Holsworthy Aerodrome station is expected to be representative of conditions in the locale of the Georges River monitoring sites.

Weather conditions during November 2022 sampling were warm to cool with 33.0 mm rain recorded at Badgerys Creek monitoring station (Table 1) and 33.2 mm recorded at Holsworthy Aerodrome (Table 2) in the week prior to sampling.

Table 1: Weather observations for Badgerys Creek AWS, NSW (BOM 2022).

Date	Temp min (°C)	Temp max (°C)	Rainfall (mm)
12/11/2022	12.2	28.7	0.0
13/11/2022	15.8	26.1	0.0
14/11/2022	16.7	26.9	32.6
15/11/2022	11.2	26.0	0.0
16/11/2022	8.0	20.2	0.0
17/11/2022	5.8	21.9	0.4
18/11/2022	9.8	23.6	0.0

Table 2: Weather observations for Holsworthy Aerodrome (BOM 2022).

Date	Temp min (°C)	Temp max (°C)	Rainfall (mm)
12/11/2022	13.0	26.7	0.0
13/11/2022	15.4	27.7	0.0
14/11/2022	17.6	26.8	33.0
15/11/2022	13.0	24.2	0.0
16/11/2022	7.3	19.7	0.0
17/11/2022	6.9	19.6	0.2
18/11/2022	9.2	21.7	0.0

Blue Green Algae (Cyanobacteria) monitoring at recreation sites in the Georges River was undertaken on November 18, 2022 during mid tide.

Results show that potentially toxic cyanobacteria was detected during sampling at site GR4, and biovolume calculations indicate (Table 3).

- NHMRC Surveillance Mode (Green Level) was triggered at recreation monitoring sites GR3, GR4 and GR5 in November 2022 (Table 3).

Table 3: Results summary for recreation monitoring sites, November 2022.

Site	Sampled	Potentially Toxic Blue Green Algae	NHMRC Alert Level	Safety Issues
GR1	Yes	Not detected	-	None
GR1.5	Yes	Not detected	-	None
GR2	Yes	Not detected	-	None
GR3	Yes	Not detected	Green	None
GR4	Yes	Detected	Green	None
GR5	Yes	Not detected	Green	None

Results show that GR1 and GR2 had no cyanobacteria species recorded, because of this, no NHMRC (2008) responses were triggered.

Results for GR1.5 showed that no NHMRC (2008) responses were triggered as only one non-toxic cyanobacteria species was recorded at low levels (*Pseudanabaena* spp. 200 cells/mL).

At GR3, six species that are not known to be toxic were recorded, including *Aphanocapsa* spp. (7870 cells/mL), *Synechococcus* spp. (425 cells/mL), *Merismopedia* spp. (600 cells/mL), *Planktothrix* spp. (360 cells/mL), *Pseudanabaena* spp. (300 cells/mL) and *Rhabdoderma* spp. (475 cells/mL). This triggered the NHMRC (2008) Surveillance Mode (Green Level).

GR4 recorded five species of cyanophytes at low levels, including one potentially toxic species *Doliospermum circinale* (1080 cells/mL). Other non-toxic species included *Aphanocapsa* spp. (9950

cells/mL), *Merismopedia spp.* (200 cells/mL), *Pseudanabaena spp.* (1300 cells/mL) and *Trichodesium spp.* (100 cells/mL). This detection triggered the NHMRC (2008) Surveillance Mode (Green Level).

Results show GR5 had five non-toxic species recorded, *Aphanocapsa spp.* (9420 cells/mL), *Cyanogranis libera* (150 cells/mL), *Synechococcus spp.* (50 cells/mL), *Merismopedia spp.* (300 cells/mL) and *Pseudanabaena spp.* (200 cells/mL). All of these detected cyanophytes are non-toxic, however due to the high biovolume of these readings, this detection had triggered the NHMRC (2008) Surveillance Mode (Green Level).

Due to the persistence of cyanobacteria, there is potential for future blooms to occur. NHMRC (2008) recommends weekly or fortnightly monitoring when 'Green' mode is triggered (Table 4).

Table 4: Recommended monitoring actions and corresponding NHMRC Alert Levels.

Blue Green Algae Alert Level	Recommended Actions
Surveillance Mode (Green Level)	<ul style="list-style-type: none"> Weekly sampling and cell counts at representative locations in the water body where known toxigenic species are present. Fortnightly for other types including regular visual inspection of water surface for scums.
Alert Mode (Amber Level)	<ul style="list-style-type: none"> Increase sampling frequency to twice weekly at representative locations in the water body where toxigenic species are dominant within the alert level definition (i.e. total biovolume) to establish population growth and spatial variability in the water body. Monitor weekly or fortnightly where other types are dominant. Make regular visual inspections of water surface for scums. Decide on requirement for toxicity assessment or toxin monitoring.
Action Mode (Red Level)	<ul style="list-style-type: none"> Continue monitoring as for alert mode. Immediately notify health authorities for advice on health risk. Make toxicity assessment or toxin measurement of water if this has not already been done. Health authorities warn of risk to public health (ie the authorities make a health risk assessment considering toxin monitoring data, sample type and variability).

Results of bacteria monitoring at recreation sites in November 2022 show that the ANZECC Primary Contact guidelines for *Faecal coliforms* was exceeded at GR1, GR3, and GR5 and the ANZECC Secondary Contact guidelines for *Faecal coliforms* was exceeded at GR4. The ANZECC Primary Contact guidelines for *Enterococci* were exceeded at GR1, GR3 and GR4. The ANZECC Secondary Contact guideline for *Enterococci* was not exceeded in November 2022 (Table 5). These results are likely due to the rainfall that was recorded earlier in the week prior to monitoring.

Table 5. Summary of conditions observed/recorded at each site during November 2022 monitoring. Orange indicates exceedance of the primary contact guideline; red indicates exceedance of the secondary contact guideline.

Recreation sites						
SITE	Sampled	Tide	<i>Faecal coliforms</i> CFU/100 mL	<i>Enterococci</i> CFU/100 mL	Safety Issues	Observations
GR1	Yes	N/A	180	56	None	Clear
GR1.5	Yes	N/A	120	15	None	Clear
GR2	Yes	N/A	78	26	None	Clear
GR3	Yes	Mid	830	45	None	Turbid
GR4	Yes	Mid	3600	120	None	Turbid
GR5	Yes	Mid	760	~30	None	Turbid
Primary Contact	-	-	150	35	-	-
Secondary Contact	-	-	1000	230	-	-

Surface water samples were collected at all freshwater monitoring sites in November 2022, with the exception of AC1 (due to construction). During the November monitoring period, freshwater sites monitored by this program remained consistent with previous monitoring events, however, there was an overall increase in total phosphorus concentrations, electrical conductivity and dissolved oxygen across the majority of sites, and a decline in total nitrogen levels.

Table 6. Summary of conditions observed/recorded at each site during November 2022 monitoring.

Site	Water quality	Aquatic Macroinvertebrates	Benthic Diatoms	Flow	Observations	Safety Issues
MC1	Yes	No	No	Normal	Turbid	None
AC1	No	No	No	-	-	No access due to construction
KC1	Yes	No	No	Normal	Turbid	None
KC2	Yes	No	No	Normal	Turbid	None
KC3	Yes	No	No	Normal	Turbid	None
KC5	Yes	No	No	Normal	Turbid	None
KC6	Yes	No	No	Normal	Turbid	None
KC8	Yes	No	No	Normal	Turbid	None
KC10	Yes	No	No	Normal	Turbid	None
KC11	Yes	No	No	Normal	Turbid	None
KC12	Yes	No	No	Normal	Turbid	None
SC1	Yes	No	No	Normal	Turbid	None
SC2	Yes	No	No	Normal	Turbid	None
BC1	Yes	No	No	Normal	Turbid	None
WG	Yes	No	No	Normal	Turbid	None
HC	Yes	No	No	Normal	Turbid	None

All data has been supplied in an Excel spreadsheet separate this report and no safety issues were recorded/observed during monitoring.

Part 2

Introduction

This report outlines results for the biannual report (June 2022 to November 2022) for the 2021-2022 monitoring period.

This report presents results of nutrient, turbidity, bacteria, and Blue Green Algae parameters which are typical indicators used to assess degradation of urban streams. Analysis of all parameters monitored by this program will be presented in the annual report.

Georges River catchment sites are reported as Recreation sites (GR1, GR1.5, GR2, GR3, GR4 and GR5) and Georges River Tributaries (AC1, MC1, HC and WG). South Creek catchment sites are reported as South Creek (SC1 and SC2), Badgerys Creek (BC1), Kemps Creek (KC1, KC5, KC8, KC10, KC11 and KC12) and Kemps Creek Tributaries (KC2, KC3 and KC6).

Rainfall

Rainfall recorded at Badgerys Creek AWS (Liverpool) (BOM 2022) was above average for three months during the sampling period (July, September and October 2022). The lowest rainfall was recorded in June (4.2 mm compared to the long-term average of 56.6 mm). The highest rainfall was recorded in July 2022 (280 mm; Figure 1). As a result, flow across freshwater monitoring sites was variable throughout the six-month period, ranging from moderate at some sites in June 2022, to elevated during the remainder of the sampling periods.

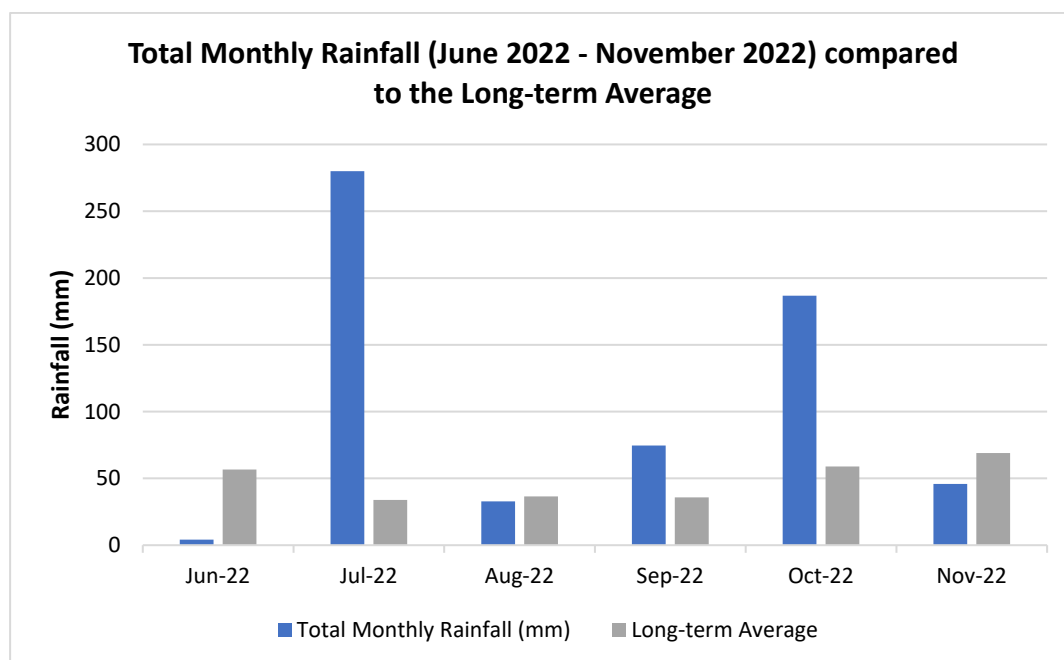


Figure 1: Rainfall recorded at Badgerys Creek AWS June 2022 – November 2022 compared to the long-term average.

Freshwater monitoring sites

Water quality was variable across all freshwater monitoring sites and all sites recorded degraded water quality and impairment typical of urban streams. The phrase ‘urban stream syndrome’ (Walsh et al. 2005) was coined to describe the multiple common symptoms occurring in urban streams, including degraded water quality, geomorphology, hydrology and biodiversity. All freshwater sites frequently recorded nutrient levels (phosphorous and nitrogen) that exceeded the Australian and New Zealand Environment Conservation Council (ANZECC) guidelines for fresh and marine water quality (2000). Other parameters, including turbidity, dissolved oxygen, pH and electrical conductivity, were also recorded to be outside the ANZECC 2000 water quality guidelines at the majority of sites at throughout the six-month monitoring period.

Total Nitrogen

Total nitrogen (TN) variations were variable across the Kemps Creek sites for the June 2022 - November 2022 period (Figure 2). Results show that all sites recorded non-compliance to the ANZECC lowland river guideline for southeast Australia (0.35 mg/L). The highest concentration, 41.7 mg/L, was recorded at KC1 in June 2022, which is approximately 119 times greater than the ANZECC guideline. TN concentrations dropped at all sites in July 2022, when rainfall was above average. There was a spatial trend where sites in the upper catchment (KC1, KC5 and KC8) had increased TN concentrations than the sites further downstream (KC10, KC11 and KC12).

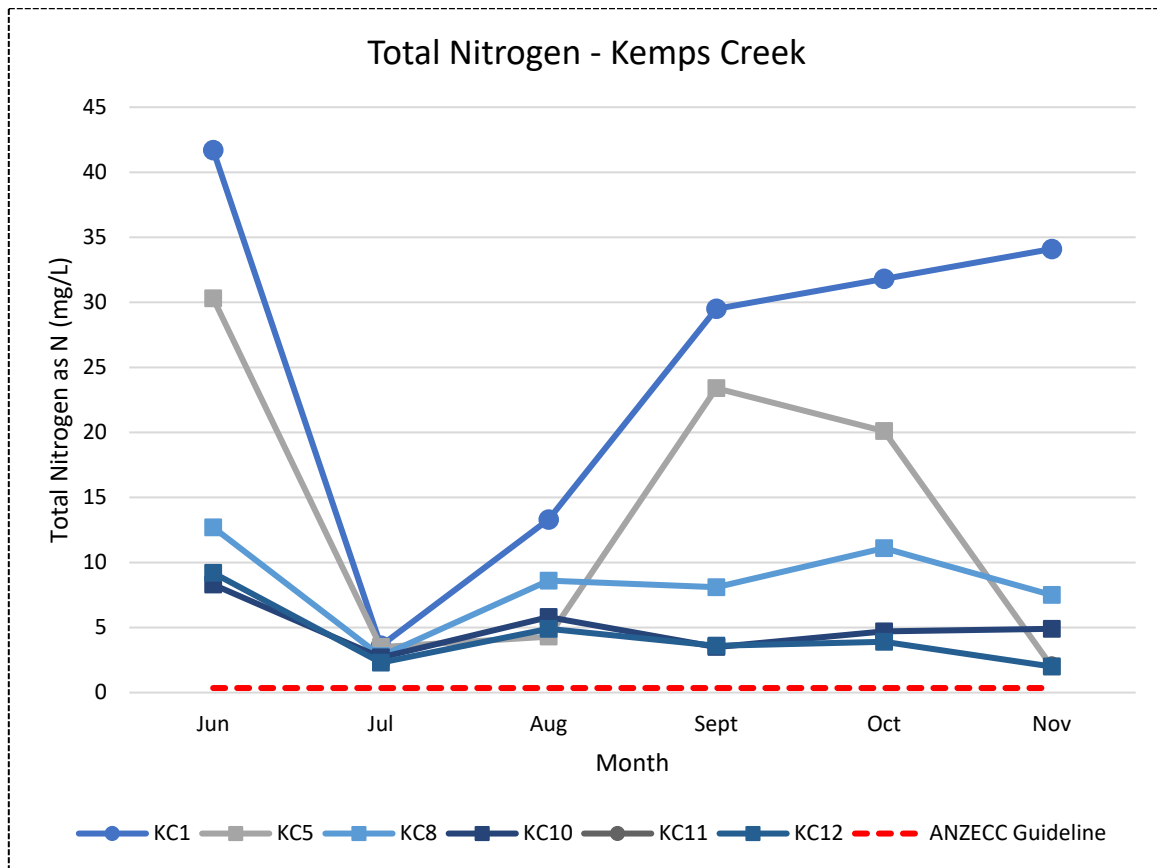


Figure 2: Total Nitrogen concentration at Kemps Creek monitoring sites June 2022 – November 2022.

Total nitrogen was variable across Kemps Creek tributary sites. All sites recorded non-compliance to the ANZECC lowland river guideline for southeast Australia (0.35 mg/L). KC6 recorded the highest TN concentration of 15.1 mg/L in August 2022 (Figure 3). These results are approximately 43 times higher than the recommended ANZECC guideline. TN remained at similar concentrations throughout the monitoring period, except for the KC6 peak in August 2022. This temporal trend aligns with the Kemps Creek total nitrogen results.

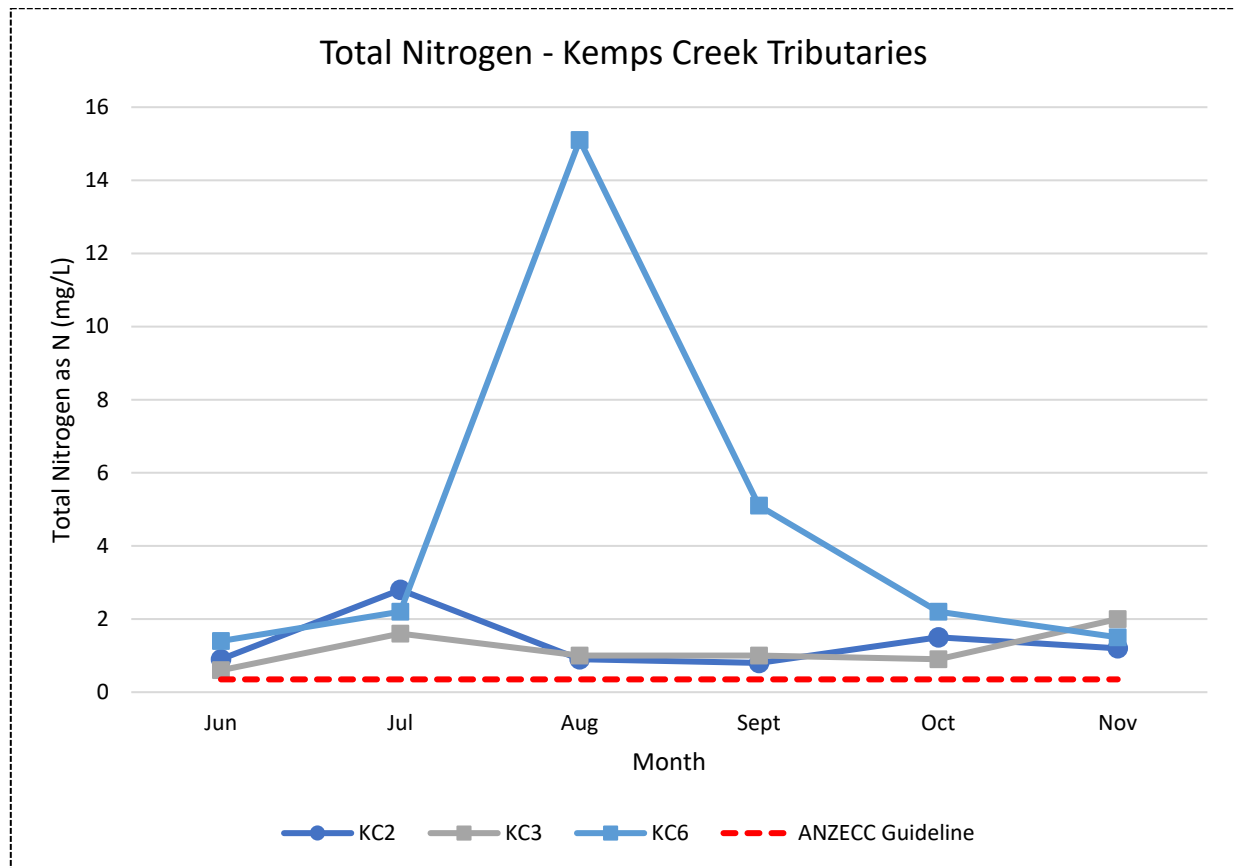


Figure 3: Total Nitrogen concentration at Kemps Creek tributary monitoring sites June 2022 – November 2022.

Total nitrogen within all sites of Georges River tributaries was fairly stable and did not comply with the ANZECC lowland river guideline for south east Australia. However, the highest TN was recorded at MC1 in September 2022, at 3.7 mg/L. TN recorded at AC1 was generally the lowest of the Georges River tributary sites, however, was still non-compliant with the ANZECC guideline during all sampling events within this biannual report (Figure 4).

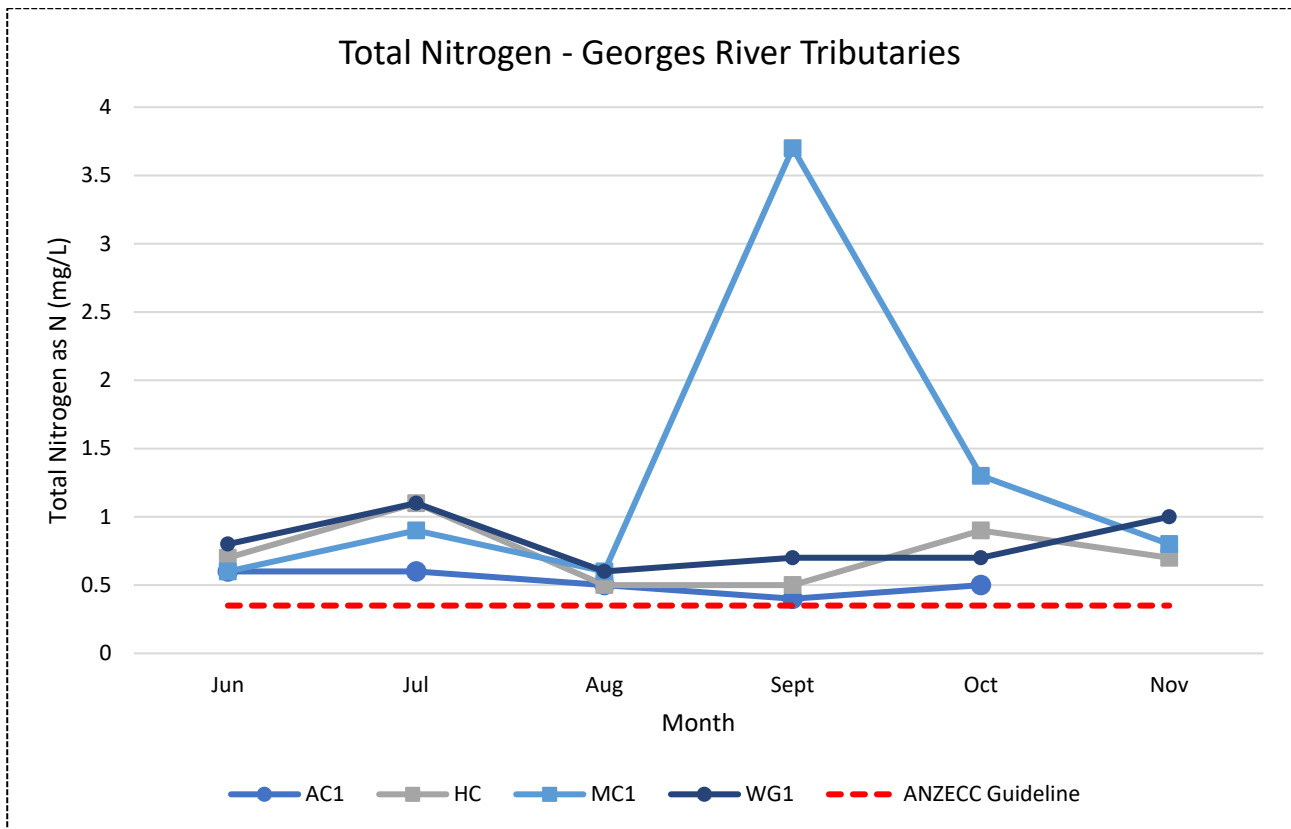


Figure 4: Total Nitrogen concentration at Georges River tributary monitoring sites June 2022 – November 2022.

Total nitrogen levels in sites within the South Creek catchment were variable and did not comply with the ANZECC guideline value of 0.35 mg/L during the monitoring period (Figure 5). TN concentration was highest at SC1 in August 2022 reaching 6.9 mg/L, followed by SC1 in June reaching 6.4 mg/L. SC2 was generally lower than SC1 and BC1.

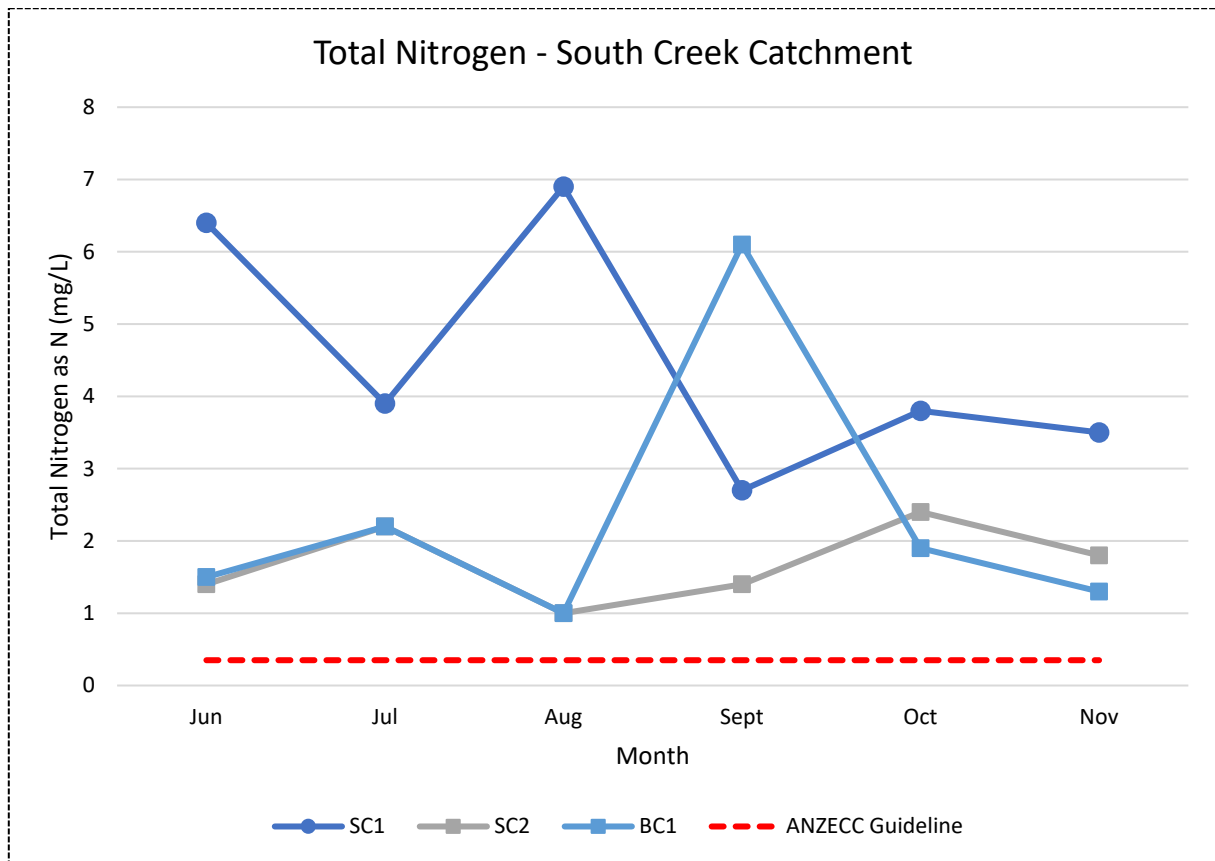


Figure 5: Total Nitrogen concentrations at South Creek catchment monitoring sites June 2022 – November 2022.

Total phosphorous

Total phosphorous (TP) was consistently high across Kemps Creek sites, with a clear decline in concentrations at all sites in July 2022 (Figure 6). All sites recorded non-compliance to the ANZECC lowland river guideline for southeast Australia of 0.025 mg/L. KC1 recorded the highest TP concentration of 4.26 mg/L in June 2022, approximately 170 times the guideline limit.

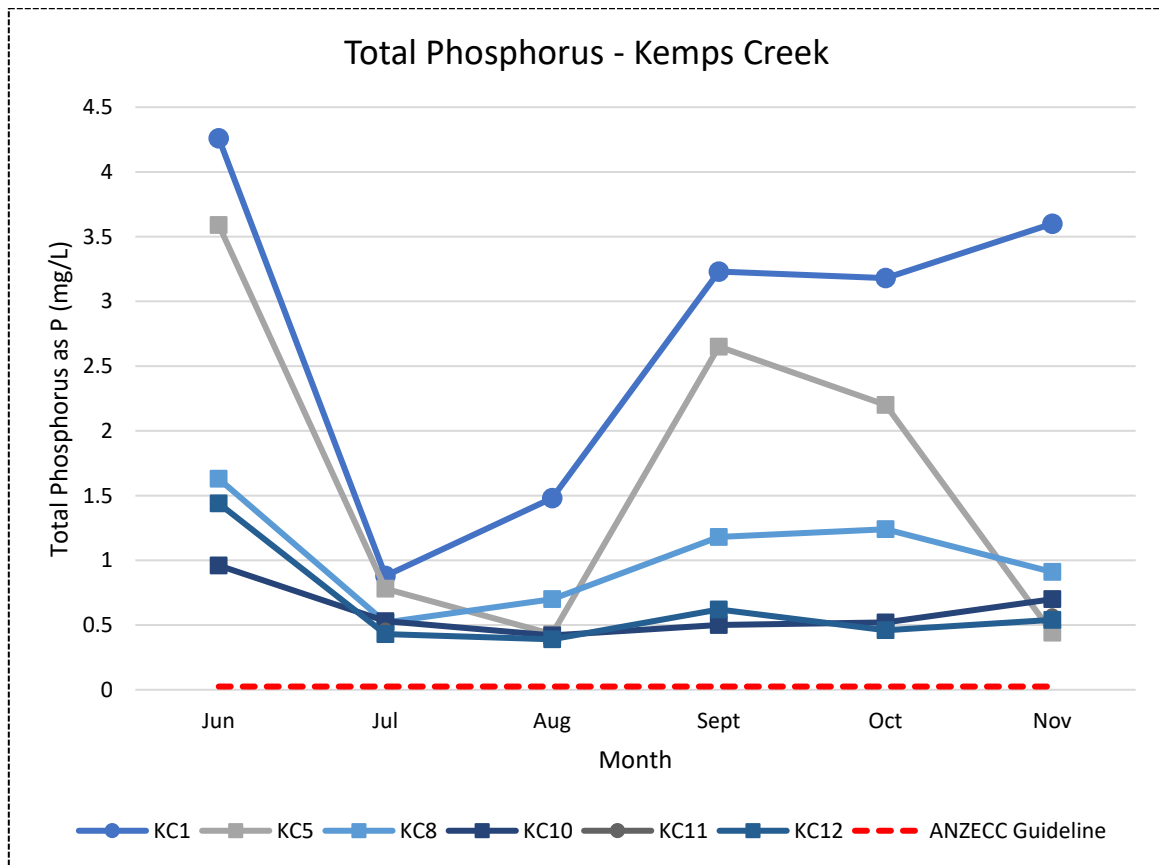


Figure 6: Total Phosphorus concentrations at Kemps Creek monitoring sites June 2022 – November 2022.

Kemps Creek tributary sites had elevated TP and did not comply to the ANZECC guideline. KC6 recorded the highest concentration of TP (1.69 mg/L) in August 2022, followed by 0.54 mg/L at KC6 in September 2022 (Figure 7). KC2 and KC3 readings were relatively constant.

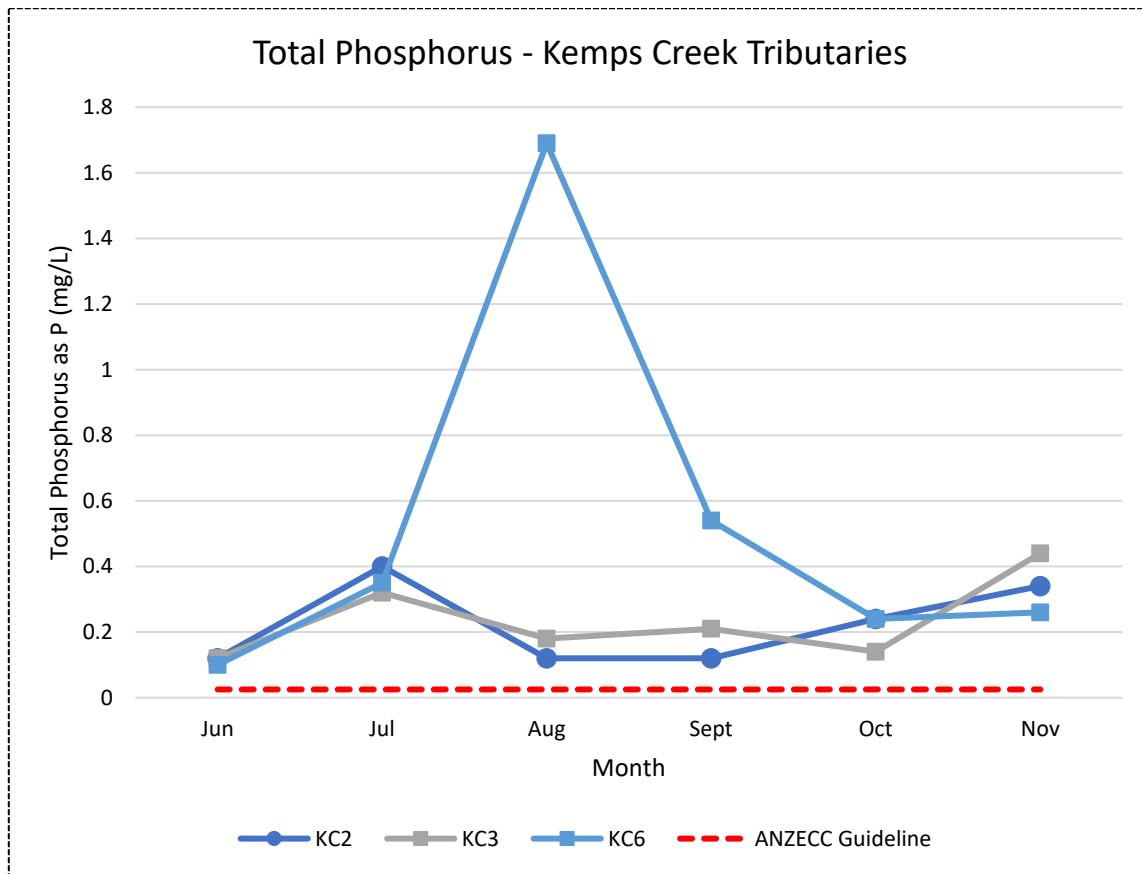


Figure 7: Total Phosphorus concentrations at Kemps Creek tributary monitoring sites June 2022 – November 2022.

Georges River tributary sites had variable TP. All sites were non-compliant to the ANZECC guideline of 0.025 mg/L on all but two occasions (including at AC1 and HC in August 2022 (0.02 mg/L). Maximum TP was recorded at MC1 was 8.33 mg/L in November 2022. The maximum TP concentration recorded at MC1 is 333 times the guideline limit (Figure 8).

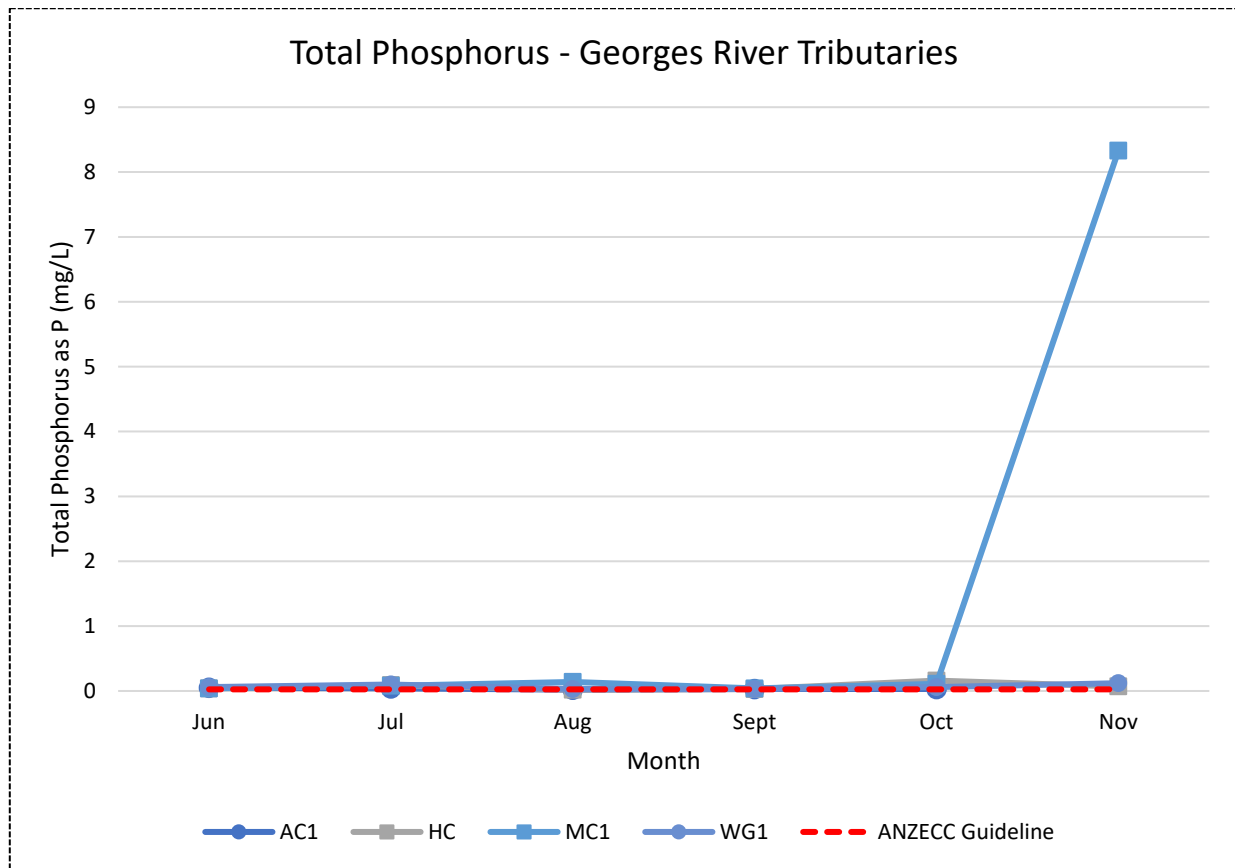


Figure 8: Total Phosphorus concentrations at Georges River tributary monitoring sites June 2022 – November 2022.

Total phosphorus concentrations at all South Creek catchment sites (SC1, SC2 and BC1) were variable and exceeded the ANZECC guideline for all monitoring events. TP was highest at SC1 in October 2022, with a value of 0.49 mg/L, which is approximately 20 times higher than the ANZECC guideline. This was followed by SC1 in November 2022, with a value of 0.47 mg/L which exceeds the guideline by approximately 19 times (Figure 9).

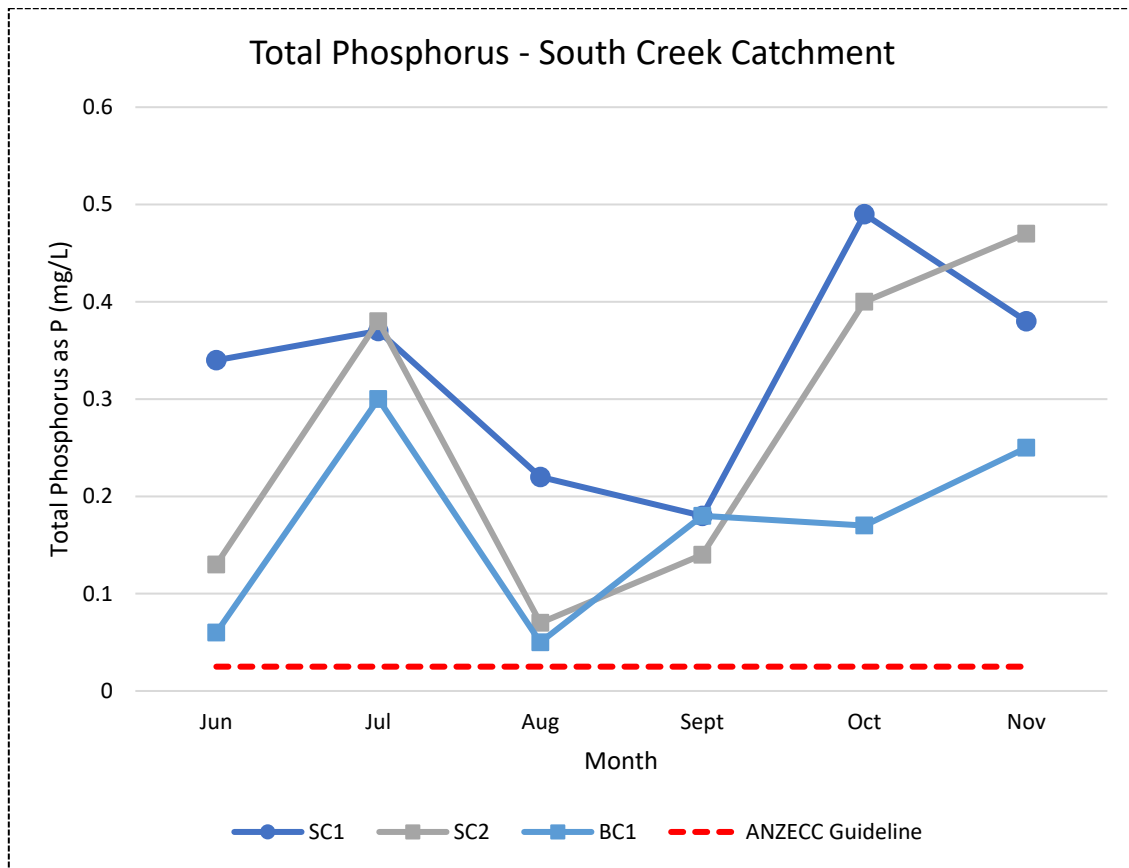


Figure 9: Total Phosphorus concentrations at South Creek catchment monitoring sites June 2022 – November 2022.

Turbidity

During the six-month monitoring period, turbidity at Kemps Creek sites was relatively consistent, however complied to the ANZECC guideline of between 6 and 50 NTU. The highest turbidity recorded was 23.4 NTU at KC1 in November 2022, followed by 21.3 NTU at KC10 in November 2022 (Figure 10). Results below the ANZECC guideline of 6 NTU should be viewed with caution as it is normal for streams with minimally disturbed catchments across the Sydney basin to have turbidity less than 6 NTU and interpreting results below this level as “non-compliant” may lead to misdiagnosis of an impact.

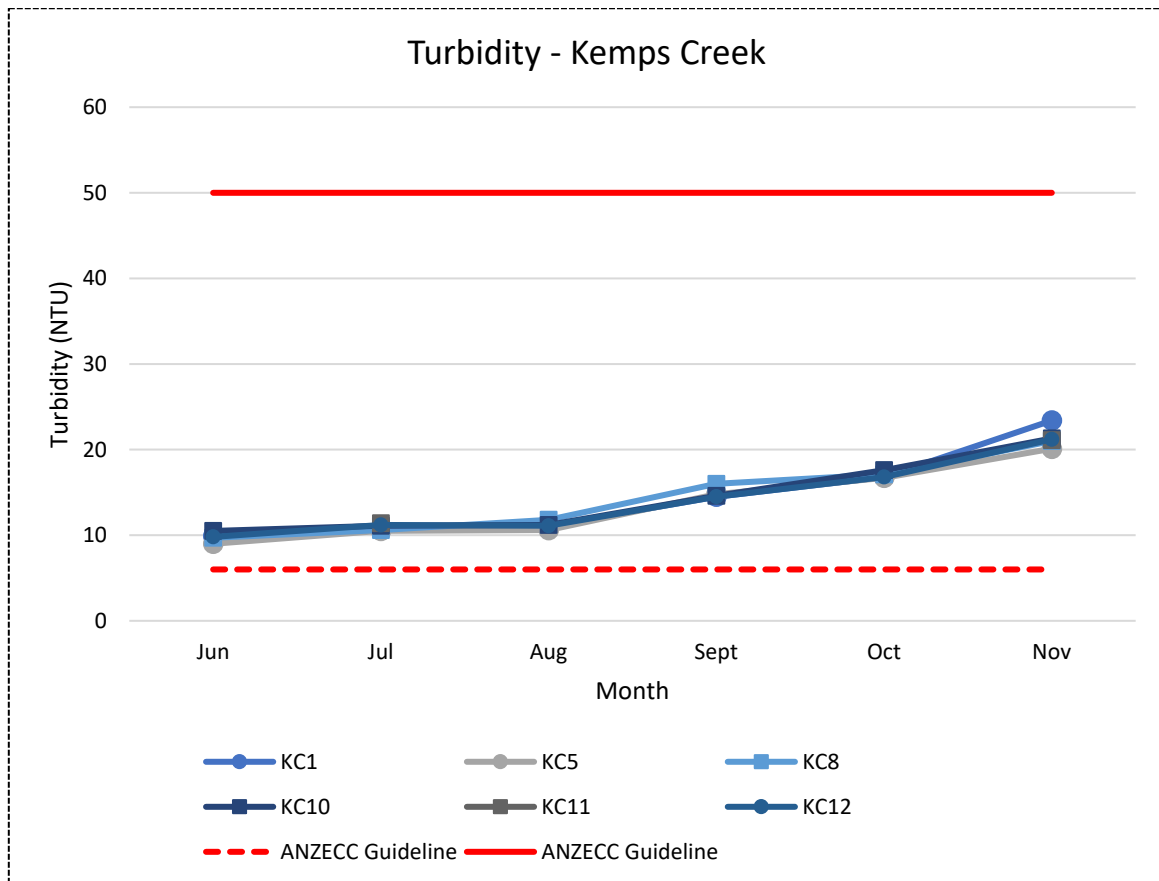


Figure 10: Turbidity at Kemps Creek monitoring sites June 2022 – November 2022.

During the six-month monitoring period, turbidity at Kemps Creek tributary sites was generally within ANZECC guideline range of 6 to 50 NTU (Figure 11). The highest value, 46.1 NTU, was recorded at KC2 in October 2022. This was followed by 41.5 NTU at KC2 in July 2022. Two sites (KC3 and KC6) were below the ANZECC guidelines lower limit on one and two occasions respectively. As stated above, comparison with this guideline should be viewed with caution and interpreting results below this level as “non-compliant” may lead to misdiagnosis of an impact.

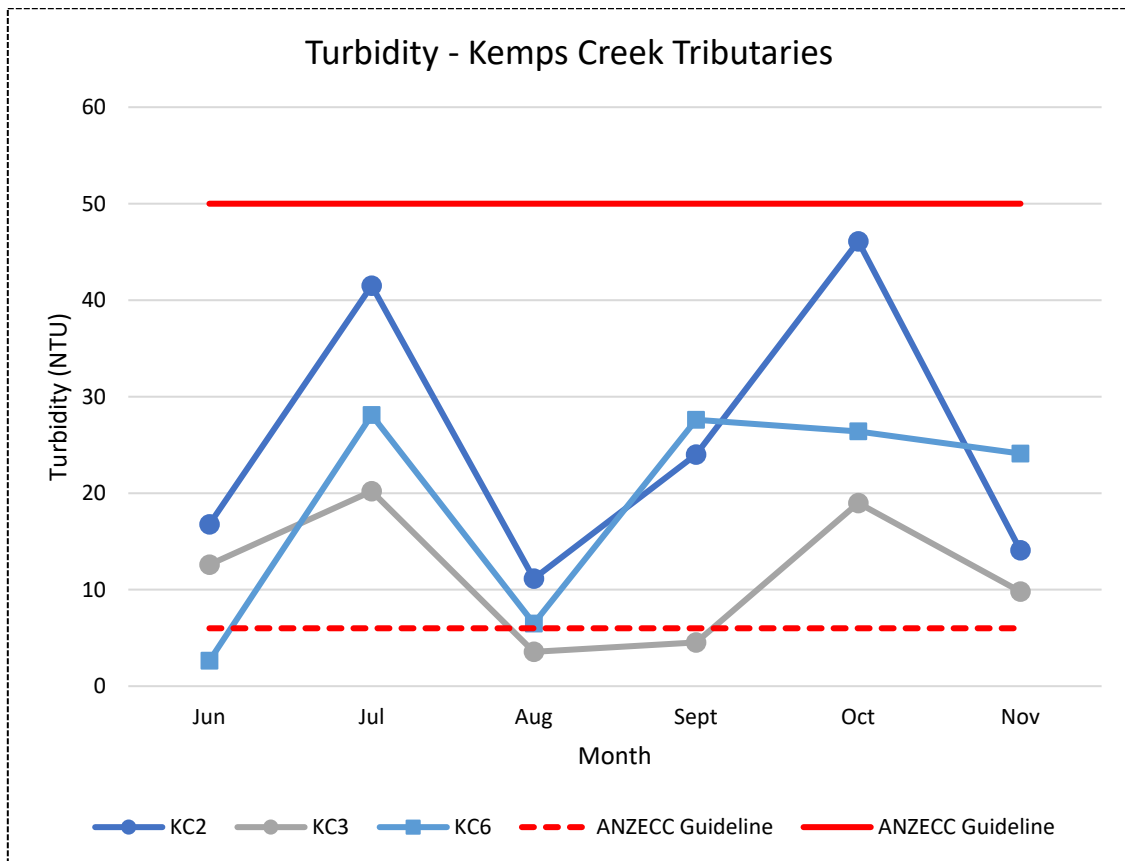


Figure 11: Turbidity at Kemps Creek tributary monitoring sites June 2022 – November 2022.

Results for Georges River tributary sites show turbidity at all sites were within or below ANZECC guideline limits from June 2022 – November 2022 on all but one occasion. The highest turbidity reading observed was at MC1, which occurred in October 2022 at 69 NTU, a value just outside the maximum ANZECC guideline of 50 NTU (Figure 12). Over the sampling period five of the twenty-four samples recorded were under the ANZECC guideline minimum limit of 6 NTU.

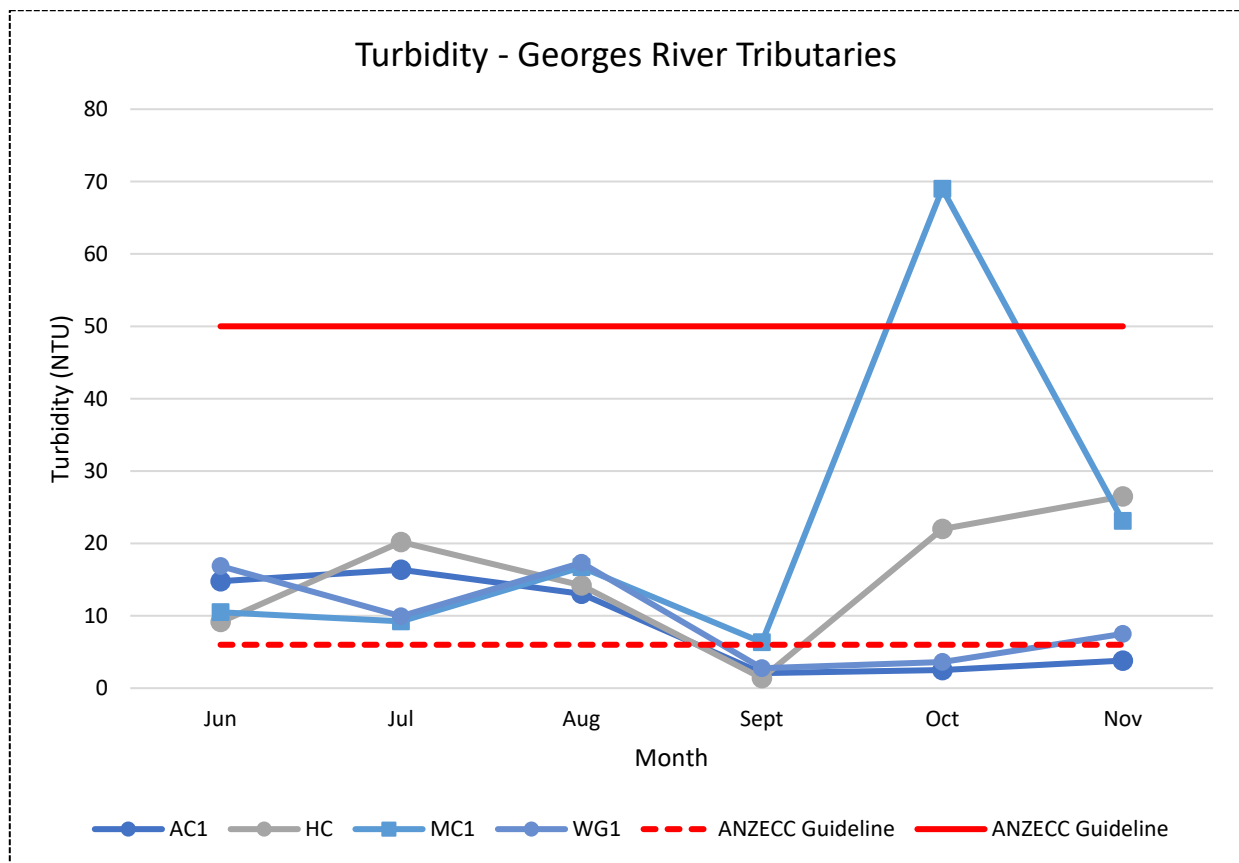


Figure 12: Turbidity at Georges River tributary monitoring sites June 2022 – November 2022.

Turbidity of the three sites within the South Creek catchment exceeded the upper ANZECC guideline on four occasions. SC1 results were above the ANZECC guidelines upper range of 50 NTU in two of the six sampling months (October (89 NTU) and November (56.4 NTU)). SC2 was above 50 NTU in two of the six sampling months (July (60.9 NTU) and October (124 NTU)). BC1 did not exceed the ANZECC (2000) upper guideline during this monitoring period. The highest turbidity reading was recorded at SC2 (124 NTU) in October 2022.

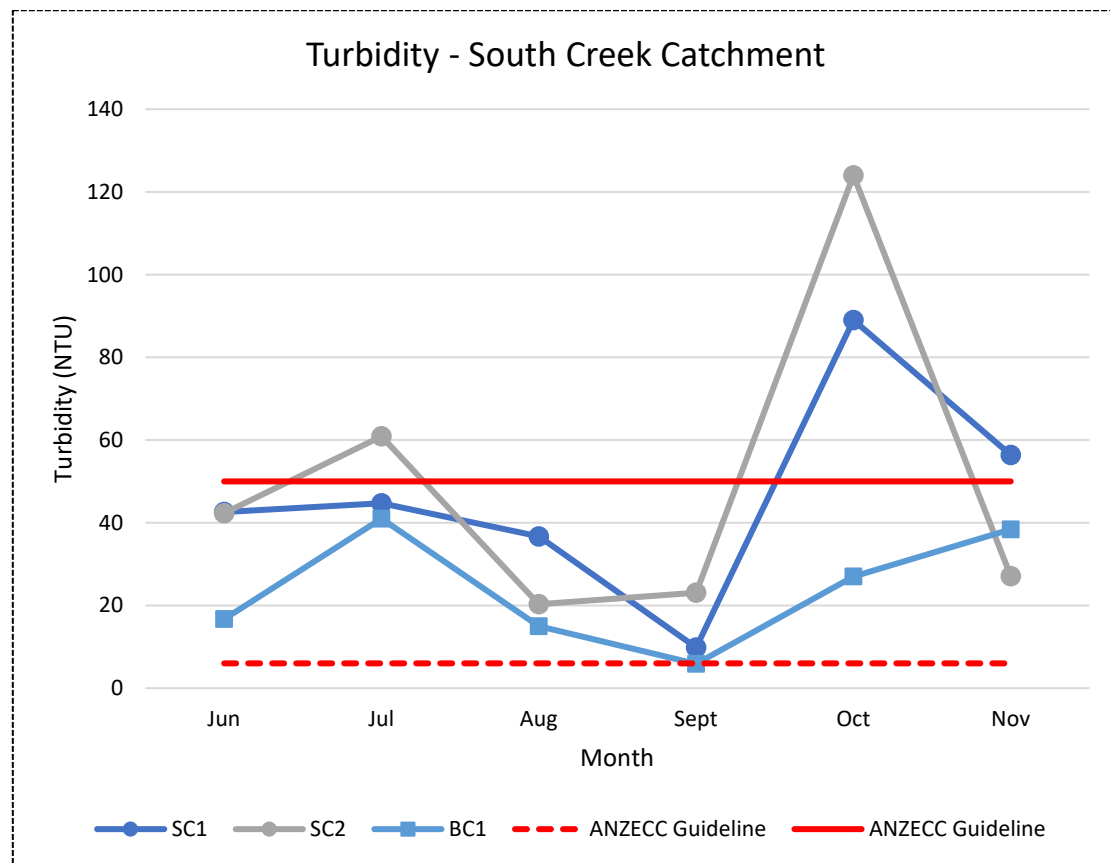


Figure 13: Turbidity at South Creek catchment monitoring sites June 2022 – November 2022.

Recreation Monitoring Sites

Turbidity

Turbidity at freshwater sites was frequently above the ANZECC primary and secondary contact guidelines (0.5 - 10 NTU) during this sampling period. At the estuary sites, there was no compliance with the primary contact guideline of 0.5 NTU. All estuary sites exceeded the secondary contact guideline of 10 NTU during the monitoring period. GR1 exceeded the secondary guideline from June to August 2022, and GR1.5 was non-compliant in June and August. GR2 exceeded the guidelines in June, August, and October 2022. GR3 exceeded the secondary contact guideline in June, August, October, and November 2022. GR4 was above the guidelines during July and August 2022. GR5 exceeded the turbidity guidelines in June, August, and November 2022.

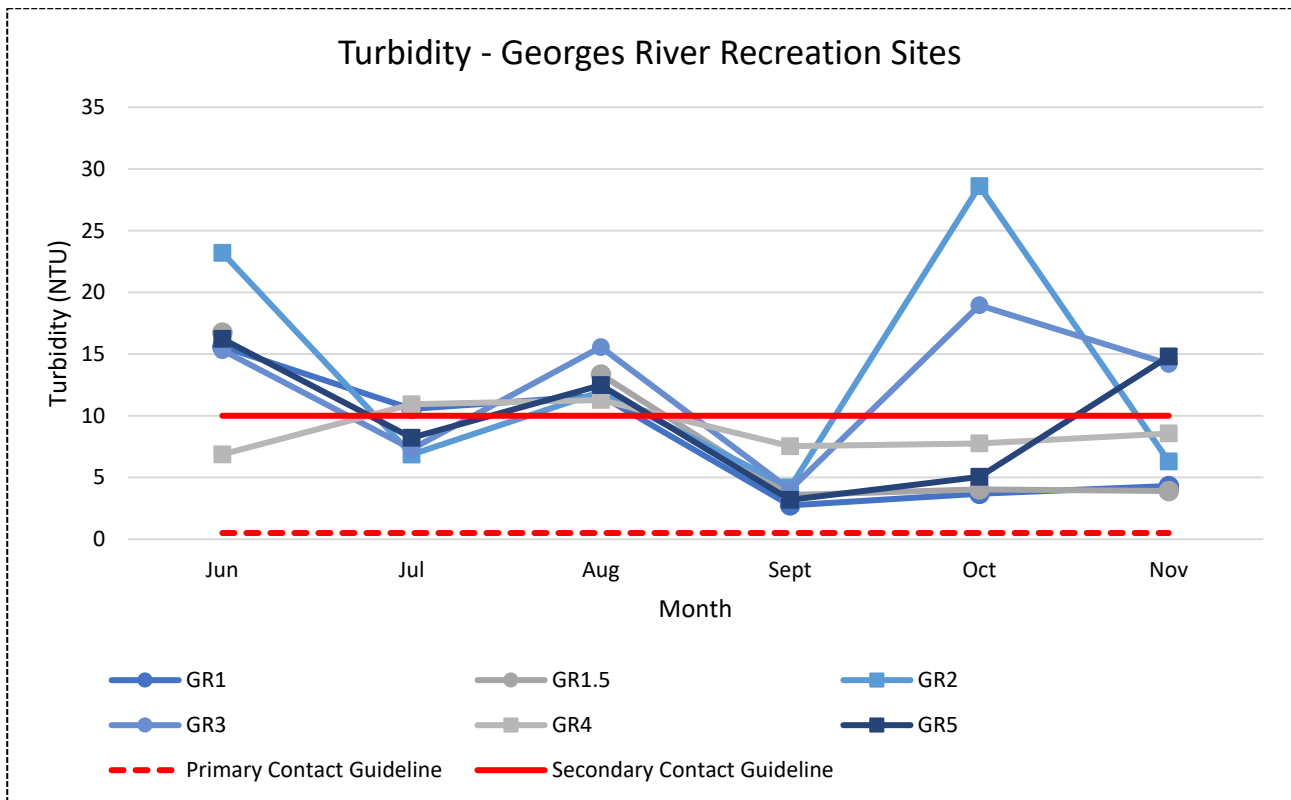


Figure 14: Turbidity at Georges River Recreation monitoring sites June 2022 – November 2022.

Faecal coliforms and Enterococci

Results of bacteria monitoring at the Georges River Recreation sites shows that breaches of the ANZECC primary and secondary contact guidelines occurred within in all months of this sampling period, excluding in August 2022 for *Faecal coliforms* (Figure 15, Figure 16).

GR1 breached the ANZECC primary contact guidelines for *Faecal coliforms* in July and November 2022. The ANZECC secondary contact guideline was not exceeded during this period. GR1 exceeded the ANZECC primary contact guidelines for *Enterococci* in July, September and November 2022. The secondary contact guideline for *Enterococci* was not exceeded at GR1 (Figure 15, Figure 16).

GR1.5 breached the ANZECC primary contact guidelines for *Faecal coliforms* on one occasion in June 2022, and the ANZECC secondary contact guideline was not exceeded. GR1.5 exceeded the ANZECC primary contact guidelines for *Enterococci* in October and November 2022. The secondary contact guideline was exceeded in June and September 2022 (Figure 15, Figure 16).

GR2 breached the ANZECC primary contact guidelines for *Faecal coliforms* in July, September, and October. The ANZECC secondary contact guideline for *Faecal coliforms* was not exceeded. GR2 exceeded the ANZECC primary contact guidelines for *Enterococci* in July, August, September, and October 2022. The secondary contact guideline for *Enterococci* was not exceeded at GR2 (Figure 15, Figure 16).

GR3 breached the ANZECC primary contact guidelines for *Faecal coliforms* in July and November 2022. The ANZECC secondary contact guideline for *Faecal coliforms* was not exceeded. GR3 exceeded the ANZECC

primary contact guidelines for *Enterococci* in October and November 2022. The secondary contact guideline was exceeded in July (Figure 15, Figure 16).

GR4 breached the ANZECC primary contact guideline for *Faecal coliforms* in June 2022. The secondary contact guideline was exceeded in July, September, and November 2022 (Figure 15, Figure 16). GR4 exceeded the ANZECC primary contact guidelines for *Enterococci* in June, September, and November 2022, and the ANZECC secondary contact guidelines was exceeded in July (Figure 15, Figure 16).

GR5 breached the ANZECC primary contact guidelines for *Faecal coliforms* in November 2022. The ANZECC secondary contact guidelines was exceeded in July and September 2022. GR5 exceeded the ANZECC primary contact guideline for *Enterococci* in September 2022. The ANZECC secondary contact guidelines was exceeded in July 2022 (Figure 15, Figure 16).

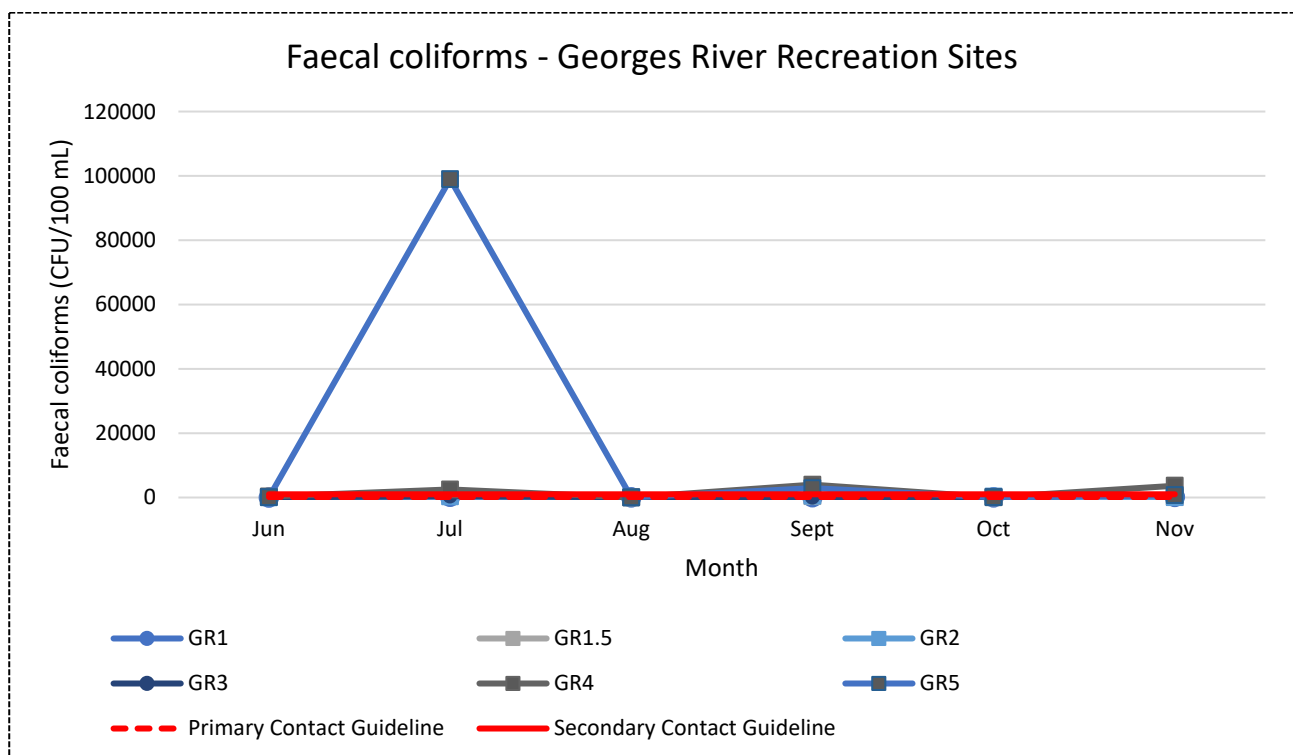


Figure 15: *Faecal coliforms* at Georges River Recreation monitoring sites June 2022 – November 2022.

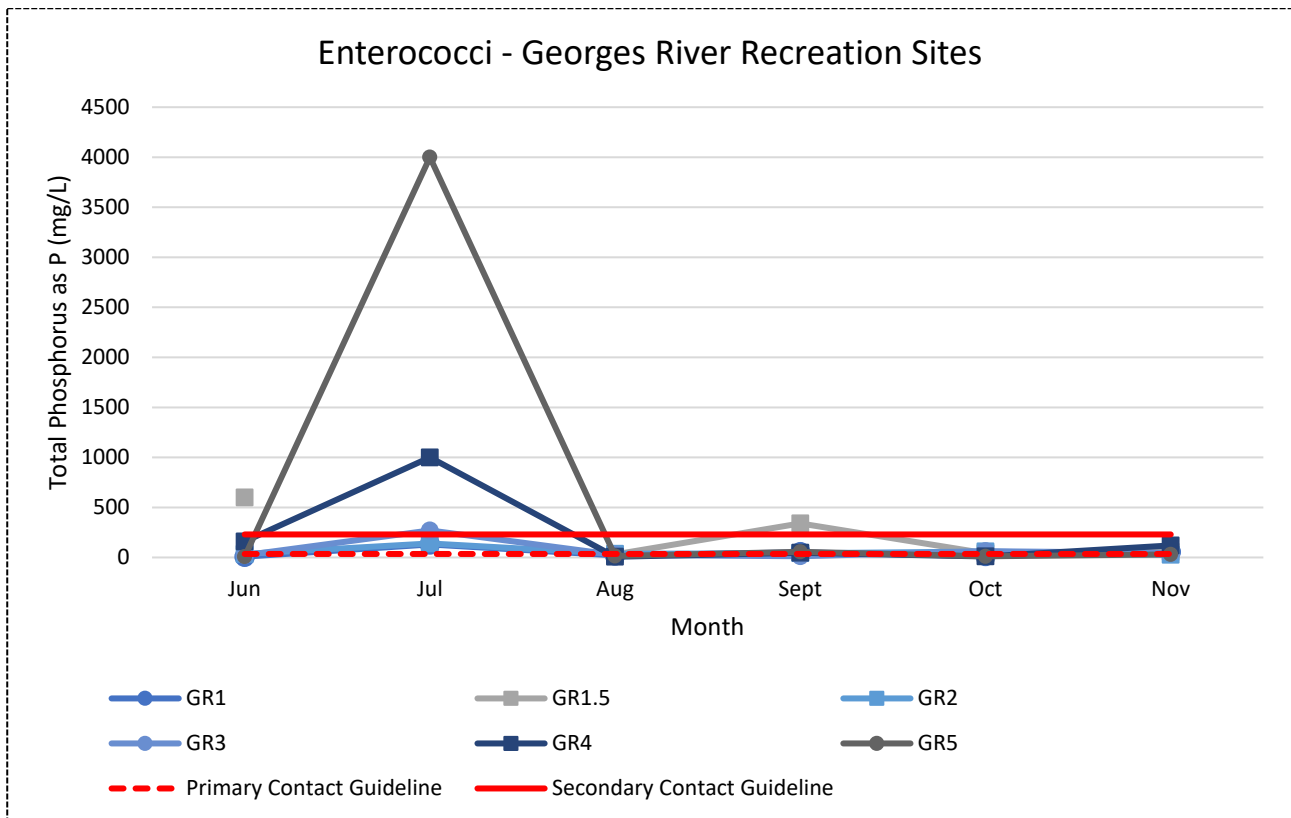


Figure 16: *Enterococci* at Georges River Recreation monitoring sites June 2022 – November 2022.

Cyanobacteria (Blue Green Algae)

Monitoring of Cyanobacteria (Blue Green Algae) show that all recreation sites are susceptible to Blue Green Algae blooms, and potentially toxic species of Blue Green Algae are commonly detected (Table 7). The highest NHMRC monitoring level is 'Red Level Action Mode' followed by the 'Amber Level Alert Mode' with 'Green Level Surveillance Mode' being the lowest level in the NHMRC (2008). Each monitoring level has a recommended response (Table 8).

Blue Green Algae Biovolume calculations indicate levels recorded across Georges River Estuary monitoring sites triggered NHMRC (2008) monitoring level 'Green Level Surveillance Mode' (NHMRC 2008) on all sampling occasions at four sites. No NHMRC (2008) alert was triggered at GR1 and GR2 during this monitoring period. GR1.5 triggered the 'Green Level Surveillance Mode' in September 2022. GR3 triggered the 'Green Level Surveillance Mode' in September and November 2022. GR4 triggered the 'Green Level Surveillance Mode' on the most occasions, in all months excluding August 2022. GR5 triggered the 'Green Level Surveillance Mode' in July, August, September, and November 2022. The 'Amber Level Alert Mode' and 'Red Level Action Mode' were not triggered in this sampling event.

Table 7: NHMRC Blue Green Algae monitoring levels for Georges River Estuary monitoring sites June 2022 – November 2022.

	GR1	GR1.5	GR2	GR3	GR4	GR5
JUNE 2022	-	-	-	-	Green	-
JULY 2022	-	-	-	-	Green	Green
AUGUST 2022	-	-	-	-	-	Green
SEPTEMBER 2022	-	Green	-	Green	Green	Green
OCTOBER 2022	-	-	-	-	Green	-
NOVEMBER 2022	-	-	-	Green	Green	Green

Table 8: NHMRC Blue Green Algae Levels and recommended response (NHMRC 2008).

NHMRC MONITORING LEVEL	RECOMMENDED RESPONSE
SURVEILLANCE MODE (GREEN LEVEL)	This level involves routine sampling to measure contaminants (e.g. physical, microbial, cyanobacterial and algal).
ALERT MODE (AMBER LEVEL)	This level requires investigation into the causes of elevated contaminant levels, and increased sampling to enable a more accurate assessment of the risks to recreational users.
ACTION MODE (RED LEVEL)	This level requires the local government authority and health authorities to warn the public that the water body is considered unsuitable for recreational use.

Conclusion

It is evident that most freshwater sites across the Liverpool LGA have elevated nutrient levels, often at orders of magnitude higher than the recommended ANZECC guidelines. Elevated nutrients in the urban and peri-urban setting are commonly sourced from stormwater run-off, sewer leakage or other wastewater sources, fertiliser contamination and decay of organic material. This program cannot quantify the source of the elevated results continually recorded across the Kemps Creek sites; however, likely drivers include the combination of low/no flow conditions associated with below average rainfall, the decay of organic matter, and increased stormwater runoff due to high rainfall and flooding events as seen in July 2022.

Turbidity at freshwater sites was observed to be similar compared to results from the previous bi-annual report. However, turbidity was variable between sites and sampling events, with elevated turbidity observed likely in response to high rainfall and flooding events. It should be noted that sites with turbidity levels less than the ANZECC water quality guidelines for lowland rivers of south-eastern Australia represent the 'natural state' of creeks within the Sydney Basin.

Results of monitoring at Georges River freshwater sites shows elevated nutrient concentrations were apparent for most of the monitoring period, the source of which is likely elevated stormwater runoff.

Turbidity at Georges River Recreation sites largely did not comply with the ANZECC guideline upper limit of 10 NTU for estuarine and marine waters. Turbidity was also variable over time, which may be associated with high rainfall events.

Monitoring of the Georges River estuary sites show bacteria levels were frequently elevated above the ANZECC (2000) Primary Contact levels, and at times above Secondary Contact levels, particularly after rainfall events, such as seen in July 2022.

Elevated levels of bacteria and Blue Green Algae are typical of urban estuaries which receive sewer overflow and nutrient enriched stormwater, which when combined with warm days can create ideal conditions for algae blooms which may include potentially toxic Blue Green Algae, as seen in the Georges River Estuary.

The 'Green Level Surveillance Mode' (NHMRC 2008) was triggered on all sampling occasions at four sites (a total of 12 times), however, the 'Amber Level Alert Mode' (NHMRC 2008) and 'Red Level Action Mode' (NHMRC 2008) were not triggered within this six-month period. This represents a decrease in algal blooms compared with the previous six-monthly report and a significant decrease in algal blooms compared to the previous year and is likely attributed to high rainfall and flushing of the system, however, the potential for algal growth to occur remained at all sites.

Statistical analysis of data collected by the monitoring program will be undertaken and presented in the annual report and program recommendations will be made.

All data has been supplied in an Excel spreadsheet separate this report and no safety issues were recorded/observed during monitoring.

If you have any questions, please get in touch.

Kind regards,



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