CTENVIRONMENTAL
ECOSYSTEM MANAGEMENT AND MONITORING

January Monthly Aquatic Ecosystem Monitoring Report

Liverpool City Council

January 2023

Project	**Liverpool Aquatic Ecosystem Monitoring 2023**
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Aquatic Ecosystem Monitoring Monthly Progress Report - January 2023

Monthly aquatic ecosystem monitoring of the Georges River and South Creek catchments was conducted on January 27, 2023.

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.

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 January 2023 sampling were warm to cool with no rain recorded at Badgerys Creek monitoring station (Table 1) and 6.8mm recorded at Holsworthy Aerodrome (Table 2) in the week prior to sampling.

Table 1: Weather observations for Badgerys Creek AWS, NSW (BOM 2023).

Date	Temp min (°C)	Temp max (°C)	Rainfall (mm)
21/02/2023	15.6	27	0
22/02/2023	16.2	20.1	0
23/02/2023	15.7	27.1	0
24/02/2023	14.7	31.5	0
25/02/2023	14.2	30.5	0
26/02/2023	15.6	36.2	0
27/02/2023	18.9	29.7	0

Table 2: Weather observations for Holsworthy Aerodrome (BOM 2023).

Date	Temp min (°C)	Temp max (°C)	Rainfall (mm)
21/02/2023	14.6	24.5	0.2
22/02/2023	16.9	20.9	0.4
23/02/2023	16.6	24.7	2.8
24/02/2023	14.7	29.1	0
25/02/2023	16.1	28.4	2.8
26/02/2023	16.8	36	0
27/02/2023	20.8	28.1	0.6

Blue Green Algae (Cyanobacteria) monitoring at recreation sites in the Georges River was undertaken on January 27, 2023, during mid tide.

Results show that potentially toxic cyanobacteria was detected at GR3 during sampling at all Georges River sites and biovolume calculations indicate (Table 3).

- NHMRC Surveillance Mode (Green Level) was triggered at the recreation monitoring sites GR1.5, GR2, and GR4 (Table 3).
- NHMRC Alert Mode (Amber Level) was triggered at the recreation monitoring sites GR3 (Table 3).

Table 3: Results summary for recreation monitoring sites, January 2023.

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

Results show GR1 had recorded no cyanobacteria in the January monitoring event. Because of this, no NHMRC (2008) responses were triggered.

GR1.5 recorded two species of cyanobacteria, *Merismopedia spp*. (770 cells/mL), and *Pseudanabaena spp.* (250 cells/mL), which are not known to be toxic. Due to the biovolume of these species, the NHMRC (2008) Green Level surveillance mode was triggered.

Results for GR2 showed that five cyanobacteria species were recorded, *Anabaena spp*. (375 cells/mL), *Aphanocapsa spp* (375 cells/mL), *Cyanogranis libera* (1120 cells/mL), *Merismopedia spp*. (300 cells/mL), and *Pseudanabaena spp.* (350 cells/mL). All of these cyanobacteria species are not known to be toxic, however, because of the biovolume of these species recorded, the NHMRC (2008) Green Level surveillance mode was triggered.

At GR3 nine cyanobacteria species were recorded. These included *Anabaena spp.* (375 cells/mL), *Aphanocapsa spp*. (375 cells/mL), *Cyanogranis libera* (1120 cells/mL), *Geitlerinema splendidum* (300 cells/mL), *Merismopedia spp*. (300 cells/mL), *Microcystis aeruginosa* (300 cells/mL*), Planktothrix spp.* (300 cells/mL), *Pseudanabaena spp.* (350 cells/mL), and *Spirulina spp.* (300 cells/mL) . All of these species are not known to be toxic, except *Microcystis aeruginosa*, which is known to be toxic. Because of the high biovolumes of the species not known to be toxic, along with the low biovolume of *Microcystis aeruginosa*, the NHMRC (2008) Amber Level Alert mode was triggered.

GR4 recorded four species of cyanophytes which included *Aphanocapsa spp*. (2200 cells/mL), *Cyanogranis libera* (200 cells/mL), *Merismopedia spp.* (400 cells/mL), and *Pseudanabaena spp*. (4300 cells/mL). Due to the biovolumes of these species the NHMRC (2008) Green Level surveillance mode was triggered.

Results show GR5 had recorded no cyanobacteria in the January monitoring event. Because of this, no NHMRC (2008) responses were triggered.

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, and twice weekly or weekly monitoring when 'Amber' 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)**	• 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)**	• 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)**	• 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 January 2023 show that the ANZECC Primary Contact guidelines for *Faecal coliforms* was exceeded at GR1, GR2, GR3, and GR5, and The ANZECC Secondary Contact guidelines for *Faecal coliforms* was exceeded at GR1.5. The ANZECC Primary Contact guidelines for *Enterococci* was exceeded at GR1, GR1.5 and GR2. The ANZECC Secondary Contact guidelines for *Enterococci* was not exceeded at any of the Georges River Monitoring sites.

At GR1, GR1.5, and GR2, *Faecal coliforms* were recorded to be elevated since the last monitoring event, where the *Faecal coliform* had reduced at GR3, GR4, and GR5. *Enterococci* results show a reduction at GR1, GR3, GR4, and GR5 from the previous month, however, at GR1.5 and GR2 , *Enterococci* results have increased.

Table 5. Summary of conditions observed/recorded at each site during January 2023 monitoring. Orange indicates exceedance of the primary contact guideline; red indicates exceedance of the secondary contact guideline.

	Recreation sites					
SITE	**Sampled**	**Tide**	***Faecal coliforms*** **CFU/100 mL**	***Enterococci*** **CFU/100 mL**	**Safety Issues**	**Observations**
GR1	Yes	N/A	320	40	None	Clear
GR1.5	Yes	N/A	1100	65	None	Clear
GR2	Yes	N/A	390	37	None	Clear
GR3	Yes	Mid	170	33	None	Clear
GR4	Yes	Mid	42	6	None	Clear
GR5	Yes	Mid	320	6	None	Clear
Primary Contact	-	-	150	35	-	-
Secondary Contact	-	-	1000	230	-	-

Surface water samples were collected at all freshwater monitoring sites in January 2023, except for KC11 (due to construction of a pipeline). During the January monitoring period, a trend occurred of most sites having a slightly lower electrical conductivity reading from the previous monitoring event, however, the freshwater sites monitored by this program typically had only a minimal change to the previous results.

Figure 1. Photo of HC

Table 6. Summary of conditions observed/recorded at each site during January 2023 monitoring.

Site	Water quality	Aquatic Macroinvertebrates	Benthic Diatoms	Flow	Observations	Safety Issues
MC1	Yes	No	No	Normal	Turbid	None
AC1	Yes	No	No	Normal	Clear	None
KC1	Yes	No	No	Normal	Turbid	None
KC2	Yes	No	No	Normal	Turbid	None
KC3	Yes	No	No	Normal	Turbid	None
KC5	No	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	No	No	No	-	-	No access due to construction
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 to this report and no safety issues were recorded/observed during monitoring.

Conclusion

Monitoring of the Georges River estuary sites show bacteria levels were partly in accordance with the ANZECC (2000) Guidelines. Some Primary Contact levels were exceeded and one Secondary Contact levels for *Faecal coliforms* was exceeded. The Cyanobacteria biovolumes were higher than the previous monitoring event, and a potentially toxic cyanobacteria were detected at one site. The NHMRC Surveillance Mode (Green Level) triggered at the recreation monitoring sites GR1.5, GR2, and GR4. The NHMRC Alert Mode (Amber Level) was triggered at the recreation monitoring sites GR3.

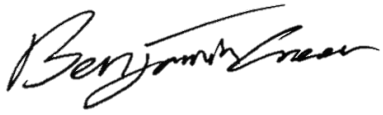
Statistical analysis of data collected by the monitoring program will be undertaken and presented in the annual report and program recommendations will be made.

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

The data from this report is reflected in the web reported supplied to Liverpool council.

If you have any questions, please get in touch.

Kind regards,



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References

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