CTENVIRONMENTAL
ECOSYSTEM MANAGEMENT AND MONITORING

July 2023 Monthly Aquatic Ecosystem Monitoring Report

Liverpool City Council

July 2023

Project	**Liverpool Aquatic Ecosystem Monitoring 2023**
Prepared For	Liverpool City Council
Authors	James Taylor (CTENVIRONMENTAL)
Reviewed by	Benjamin Green (CTENVIRONMENTAL)
Approved by	Carl Tippler (CTENVIRONMENTAL)
Version	FINAL

This report should be cited as: 'CTENVIRONMENTAL (2023) *July 2023 Monthly Aquatic Ecosystem Monitoring Report.* Prepared for Liverpool City Council.

CTECS PTY LTD Trading as CTENVIRONMENTAL

422 Yabtree Road, Borambola, NSW, 2650

M: 0400 216 206

www.ctenvironmental.com.au

Aquatic Ecosystem Monitoring Monthly Progress Report - July 2023

Monthly aquatic ecosystem monitoring of the Georges River and South Creek catchments was conducted on July 04, 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 July sampling were warm to cool with 6.6 mm of rain recorded at Badgerys Creek AWS (Table 1) and 8.2 mm 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)
28/06/2023	9.2	10.9	0.6
29/06/2023	6.6	15.1	4.2
30/06/2023	4.8	18.5	0
01/07/2023	1.5	17.9	0
02/07/2023	4.9	18.4	0
03/07/2023	6.1	18.7	0
04/07/2023	10.3	14.2	1.8

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

Date	Temp min (°C)	Temp max (°C)	Rainfall (mm)
28/06/2023	9.2	11	1.8
29/06/2023	5.6	14.9	2.4
30/06/2023	7.5	17.4	0
01/07/2023	2.9	17.8	0
02/07/2023	5.9	18.0	0
03/07/2023	7.4	18.4	0
04/07/2023	11.5	14.5	4.0

Blue Green Algae (Cyanobacteria) monitoring at recreation sites in the Georges River was undertaken on July 04, 2023, during high tide.

Results show that potentially toxic cyanobacteria were not detected at any sites during sampling at all Georges River sites, and biovolume calculations indicate (Table 3) -

- NHMRC Surveillance Mode (Green Level) was triggered at the recreation monitoring site GR4 (Table 3).

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

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	-	None
GR4	Yes	Not detected	**Green**	None
GR5	Yes	Not detected	-	None

GR1 recorded two species of cyanobacteria, *Anathece* spp. and *Pseudanabaena* spp. Due to the low biovolume of these species, species no NHMRC (2008) mode was triggered.

GR1.5 recorded one species of cyanobacteria, *Pseudanabaena* spp. and *Romeria* spp. Due to the low biovolume of these species no NHMRC (2008) mode was triggered.

GR2 recorded three species of cyanobacteria, *Aphanocapsa* spp*., Pseudanabaena* spp. and *Romeria* spp. Due to the low biovolume of these species no NHMRC (2008) mode was triggered.

GR3 recorded one species of cyanobacteria, *Merismopedia* spp*.* Due to the low biovolume of this species no NHMRC (2008) mode was triggered.

GR4 recorded four species of cyanobacteria, *Anabaena* spp., *Anagnostidinema* spp., *Aphanocapsa* spp*.,* and *Pseudanabaena* spp*.* Due to the biovolume of these species, the NHMRC (2008) Green Level surveillance mode was triggered.

GR5 recorded two species of cyanophytes*, Aphanocapsa spp.* and *Merismopedia* spp. Due to the low biovolume of this species no NHMRC (2008) mode was 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 (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 July 2023 show that the ANZECC Primary Contact guidelines for *Faecal coliforms* was exceeded at one George River Sites (GR2) and the ANZECC Secondary Contact guidelines for *Faecal coliforms* was exceeded at one Georges River Site (GR3). The ANZECC Secondary Contact guidelines for *Enterococci* was exceeded at GR2, GR3, and GR4, and the ANZECC Primary Contact guidelines for *Enterococci* was exceeded at GR1 and GR1.5.

Table 5. Summary of conditions observed/recorded at each site during July 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	23	100	None	Clear
GR1.5	Yes	N/A	65	150	None	Clear
GR2	Yes	N/A	200	260	None	Clear
GR3	Yes	Mid	2200	560	None	Clear
GR4	Yes	Mid	110	790	None	Clear
GR5	Yes	Mid	20	7	None	Clear
Primary Contact	-	-	150	35	-	-
Secondary Contact	-	-	1000	230	-	-

Surface water samples were collected at all freshwater monitoring sites in July 2023, except for KC11 (due to construction of a pipeline).

Table 6. Summary of conditions observed/recorded at each site during July 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	Clear	None
KC2	Yes	No	No	Normal	Clear	None
KC3	Yes	No	No	Normal	Clear	None
KC5	Yes	No	No	Normal	Clear	None
KC6	Yes	No	No	Normal	Clear	None
KC8	Yes	No	No	Normal	Clear	None
KC10	Yes	No	No	Normal	Clear	None
KC11	No	No	No	-	-	No access due to construction
KC12	Yes	No	No	Normal	Clear	None
SC1	Yes	No	No	Normal	Clear	None
SC2	Yes	No	No	Normal	Turbid	None
BC1	Yes	No	No	Normal	Clear	None
WG	Yes	No	No	Normal	Clear	None
HC	Yes	No	No	Normal	Clear	None

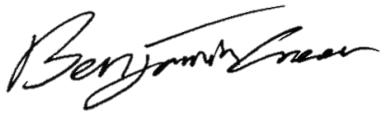
All data has been supplied in an Excel spreadsheet separate to this report and no safety issues were recorded/observed during monitoring.

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

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,



Benjamin Green

Ecologist – Aquatic and Riparian Specialist

0476 240 148

ben@ctenvironmental.com.au

References

ANZECC & ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

BOM (2023) www.bom.gov.au (accessed July 28, 2023).

NHMRC (2008) Guidelines for Managing Risks in Recreational Water