



CTENVIRONMENTAL

ECOSYSTEM MANAGEMENT AND MONITORING



November 2023 Monthly Aquatic Ecosystem Monitoring Report

Liverpool City Council

September 2023

Project	Liverpool City Council Aquatic Ecosystem Monitoring 2023
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Version	FINAL

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

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Aquatic Ecosystem Monitoring Monthly Progress Report - November 2023

Monthly aquatic ecosystem monitoring of the Georges River and South Creek catchments was undertaken on November 14, 2023.

This report provides a summary of recreation water quality indicators (*Cyanobacteria*, *Faecal coliforms* and *Enterococci*) 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 November sampling were warm with 6.2 mm of rain recorded at Badgerys Creek AWS (Table 1) and 17.4 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)
25/08/2023	13.2	30.6	0
26/08/2023	13.8	30.7	0.4
27/08/2023	15.8	29.2	5.6
28/08/2023	15.2	35.4	0.2
29/08/2023	16.1	32.0	0
30/08/2023	16.0	25.4	0
31/08/2023	13.9	31.1	0

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

Date	Temp min (°C)	Temp max (°C)	Rainfall (mm)
25/08/2023	12.6	28.9	0
26/08/2023	14.0	28.9	1.6
27/08/2023	15.4	25.7	15.8
28/08/2023	15.8	30.8	0
29/08/2023	16.2	26.7	0
30/08/2023	16.8	22.8	0
31/08/2023	15.4	28.2	0

Blue Green Algae (Cyanobacteria) monitoring at recreation sites in the Georges River was undertaken on November 14, 2023, during the mid tide.

Results show that potentially toxic cyanobacteria were not detected during sampling at all Georges River sites. Biovolume calculations indicate that NHMRC (2008) Green Level Surveillance mode was triggered at five of the Georges River recreation monitoring sites (GR1.5, GR2, GR3, GR4, and GR5) (Table 3).

Table 3: Results summary for recreation monitoring sites, November 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	Green	None
GR4	Yes	Not detected	Green	None
GR5	Yes	Not detected	Green	None

Three species of cyanobacteria were recorded at GR1 which included *Pseudanabaena spp.*, *Rhabdoderma spp.*, and *Romeria spp.* Biovolume of these species were not detected at concentrations high enough to trigger an NHMRC (2008) alert.

Three species were recorded at GR1.5 which included *Aphanocapsa spp.*, *Pseudanabaena spp.*, and *Romeria spp.* Although only low concentrations were found, the biovolume of these species were high enough to trigger the NHMRC (2008) Green Level Surveillance Mode.

Three species were recorded at GR2 which included *Aphanocapsa spp.*, *Pseudanabaena spp.*, and *Romeria spp.* Although only low concentrations were found, the biovolume of these species were high enough to trigger the NHMRC (2008) Green Level Surveillance Mode.

GR3 recorded six species of cyanobacteria (*Aphanocapsa spp.*, *Glaucospira spp.*, *Phormidium spp.*, *Pseudanabaena spp.*, *Romeria spp.*, and *cf. Synechococcus spp.*). Although only low concentrations were found, the biovolume of these species were high enough to trigger the NHMRC (2008) Green Level Surveillance Mode.

GR4 recorded one species of cyanobacteria (*Romeria spp.*). Because of the biovolume of these species, NHMRC (2008) Green level Surveillance mode was triggered.

Three species were recorded at GR5 which included *Aphanocapsa spp.*, *Pseudanabaena spp.*, and *Romeria spp.* Although only low concentrations were found, the biovolume of these species were high enough to trigger the NHMRC (2008) Green Level Surveillance Mode.

Due to the persistence of cyanobacteria, there is potential for future blooms to occur. NHMRC (2008) recommends weekly or fortnightly monitoring if the '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 2023 show that the ANZECC Primary Contact Guideline for *Faecal coliforms* was exceeded at GR1.5, GR3, GR4, and GR5.

The ANZECC Primary and Secondary Contact Guidelines for *Enterococci* was exceeded at GR1.5, GR3, GR4, and GR5.

Table 5. Summary of conditions observed/recorded at each site during November 2023 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	90	14	None	Clear
GR1.5	Yes	N/A	240	990	None	Clear
GR2	Yes	N/A	89	11	None	Clear
GR3	Yes	Mid	330	230	None	Clear
GR4	Yes	Mid	560	870	None	Clear
GR5	Yes	Mid	450	430	None	Clear

Primary Contact	-	-	150	35	-	-
Secondary Contact	-	-	1000	230	-	-

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

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

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



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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 November 28, 2023).

NHMRC (2008) Guidelines for Managing Risks in Recreational Water