

Pre-construction Water Quality Monitoring Report

Event 18 2023

Project Number: 22-013



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1. Introduction

In 2020 Snowy Hydro Limited (Snowy Hydro) obtained approval (application number SSI 9208 and EPBC 2018/8322) to expand the existing Snowy Mountains Hydro-electric Scheme (Snowy Scheme), by linking the existing Tantangara and Talbingo reservoirs through a series of underground tunnels and constructing a new underground hydro-electric power station (referred to as 'Snowy 2.0').

To connect Snowy 2.0 to the National Energy Market (NEM), a new transmission connection is required. NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (known as TransGrid and the Proponent) will construct a substation and overhead transmission lines (the Project) to facilitate the connection of Snowy 2.0 to the existing electrical transmission network. The Project location is approximately 27 kilometres (km) east of Tumbarumba, New South Wales (NSW). UGL has been engaged on behalf of the Proponent to undertake the Project.

The purpose of the pre-construction water quality monitoring is to address the requirements of the Environmental Impact Statement (EIS) (Jacobs 2020) that was prepared by the Proponent under Part 5, Division 5.2 of the NSW *Environmental Planning and Assessment Act 1979* to assess the environmental impacts of the proposed Project. Subsequently, an Amendment Report (TransGrid 2021b) was submitted with the Response to Submissions (TransGrid 2021a) to the Department of Planning and Environment (DPE) with updated mitigation measures for the Project.

The objective of the pre-construction surface water quality monitoring is to collect baseline data prior to Project construction works. Baseline data will be compared to ANZG (2018) guidelines to characterise the existing surface water quality. The data will be compared to the water quality objectives (WQO) for the Project area.

2. Program and methodology

The Pre-construction Water Quality Monitoring Program and Methodology (the Program) (NGH 2022) has been prepared to detail the WQOs for the Project, the location of the monitoring locations and the methodology for water sampling.

The Project area within Kosciuszko National Park is an area of high conservation value. Therefore, the water quality objectives for physical and chemical stressors includes **no change beyond natural variability** (ANZG 2018). The Default Guideline Values (DGV) for Upland Rivers has been provided for physical and chemical stressors and is detailed in the Program (NGH 2022).

The location of the sampling points in relation to the Project footprint is provided in Figure 2-1.

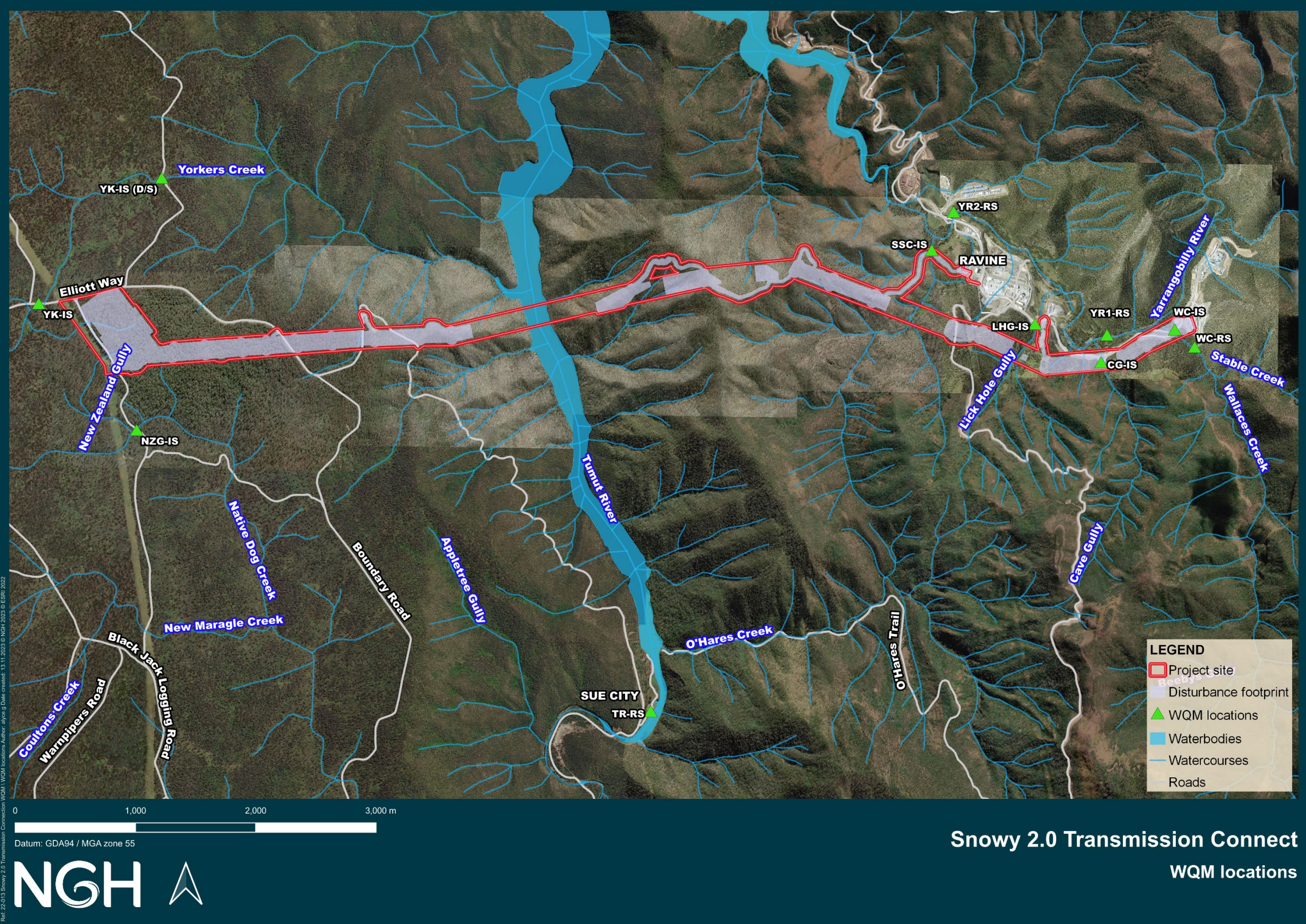


Figure 2-1 WQM locations

3. Monitoring event observations and results

Images for Wallaces Creek, Yarrangobilly River and New Zealand Gully are provided as Figure 3-1 to Figure 3-3. Water quality results for each site are provided in Appendix A. Results are highlighted where they exceed the default guideline value (refer to the Program (NGH 2022)). Table 3-1 identifies exceedances of the DGVs for metals, cyanide and nutrients. Physico-chemical results have been provided in Figure 3-4 to Figure 3-33. Field data and observations are provided in Appendix B.

3.1. Event 18

NGH has conducted 18 monthly sampling events since March 2022 (Event 1). Reports for each event were prepared following receipt of the laboratory results (NGH 2022a – 2023g). The results of Event 1 through to Event 17 have been compared in this report to the results of Event 18.

NGH Environmental Scientists, Claire Hobbs and Martin Wyburn, conducted the Event 18 monitoring with a UGL representative on 28 and 29 August 2023. The weather was sunny with a slight breeze. Data from the Cabramurra SMHEA automatic weather station on 28 August 2023 (Station ID 072161) indicates that morning winds were from the east with speeds of 15 km/hr. During the afternoon, winds were from the north with speeds of 13 km/hr. Temperatures on the day included a low of 2.7°C and a high of 9.2°C. Data from the Tumbarumba weather station for 29 August 2023 (Station ID 072043) indicates that the weather was calm with temperatures ranging from a low of 2.5°C to a high of 19.5°C.

Clear flows were observed at most locations. However, cloudy flows were noted at YK-IS (D/S), YK-IS and YK-RS. No hydrocarbon sheen or odours were noted. The banks of each channel were well vegetated, with the vegetation matrix weedier in some locations. Evidence of bank erosion from hooved animals was observed at the New Zealand Gully site, the Yorkers Creek impact site and the Yorkers Creek reference site. Water was observed to have moderate to fast flows. Water levels within Talbingo Reservoir have replenished since the last sampling event.

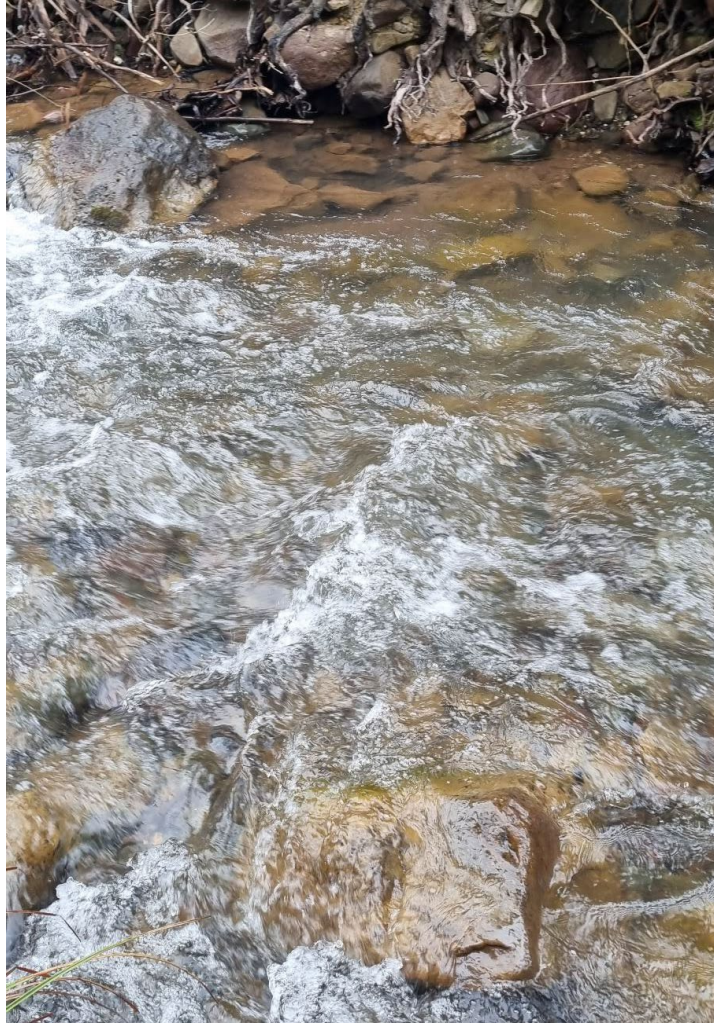


Figure 3-1 Wallace's Creek (WC-RS)



Figure 3-2 Yarrangobilly River (YR2-RS)



Figure 3-3 New Zealand Gully (NZG-IS)

3.1.1. Results

The results indicate that the water quality in the locations where samples were taken generally meets the DGVs for Upland Rivers with a 99% species protection level for toxicants. Locations where a laboratory result was returned for a physical or chemical stressor above the DGV are provided in Table 3-1.

Table 3-1 Results above the DGV for Upland Rivers with 99% species protection level

Site identification	Analyte	DGV	Result	Comment
WC-RS	Aluminium mg/L	0.027	0.19	The results for Aluminium have slightly increased, when compared with results for Event 17.
	Reactive Phosphorous mg/L	0.015	0.03	Results for Reactive Phosphorous are elevated, which is atypical of this sampling location.
CG-IS	Aluminium mg/L	0.027	0.06	The results for Aluminium have slightly increased compared with results for Event 17.
	Lead mg/L	0.001	0.004	Results for Lead are elevated, which is atypical of this sampling location.
	Zinc mg/L	0.0024	0.006	Results for Zinc are consistent with prior sampling

Site identification	Analyte	DGV	Result	Comment
	Total Dissolved Solids (TDS) mg/L		224	events. Always returns a high total dissolved solid result.
LHG-IS	Aluminium mg/L	0.027	0.14	The results for Aluminium have increased compared with results for Event 17.
	Lead mg/L	0.001	0.007	Results for Lead are elevated, which is atypical of this sampling location.
	Zinc mg/L	0.0024	0.008	Results for Zinc and Reactive Phosphorus are consistent with prior sampling events.
	Reactive Phosphorous mg/L	0.015	0.02	Always returns a high total dissolved solid result.
	Total Dissolved Solids (TDS) mg/L		312	
WC-IS	Aluminium mg/L	0.027	0.18	Results for Aluminium have increased when compared with Event 17.
	Reactive Phosphorous mg/L	0.015	0.09	Results for Reactive Phosphorous are elevated, when compared to Event 17.
YK-IS (D/S)	Aluminium mg/L	0.027	0.36	Results for Aluminium and Zinc are consistent with Event 17.
	Zinc mg/L	0.0024	0.022	Results for Reactive Phosphorous have increased, when compared to Event 17.
	Reactive Phosphorous mg/L	0.015	0.03	Located within Bago State Forest and adjacent to an unsealed track. Unknown activities within the State Forest upstream. Sample taken upstream of culvert.
NZG-IS	Aluminium mg/L	0.027	0.22	Results for Aluminium have increased, when compared with Event 16.
	Lead mg/L	0.001	0.004	Results for Lead are elevated, compared with prior sampling events, which is atypical of this location. Located within Bago State Forest. Sample taken upstream of timber supported unsealed track bridge. Banks heavily vegetated, shallow channel.
YK-RS	Aluminium mg/L	0.027	0.71	Results for Aluminium, Iron and Reactive Phosphorous are elevated, compared with previous sampling events.
	Iron mg/L	0.3	0.47	Results for Zinc and Nitrogen Oxides are above the DGV, which is atypical of this sampling location.

Site identification	Analyte	DGV	Result	Comment
	Zinc mg/L	0.0024	0.026	Located within Bago State Forest and adjacent to an unsealed track. Unknown activities within the State Forest upstream. Sample taken downstream of culvert under unsealed track. Flow through culvert is restricted upstream causing a wetland environment.
	Reactive Phosphorous mg/L	0.015	0.07	
YK-IS	Aluminium mg/L	0.027	0.48	Results for Aluminium and Iron have increased when compared with Event 17.
	Iron mg/L	0.3	0.31	Results for Lead are elevated, which is atypical of this sampling location.
	Lead mg/L	0.001	0.003	
YR1-RS	Aluminium mg/L	0.027	0.17	Results for Aluminium have increased, when compared with Event 17.
	Lead mg/L	0.001	0.005	Results for Lead and Reactive Phosphorous are elevated, which is atypical of this location.
	Reactive Phosphorous mg/L	0.015	0.07	
YR2-RS	Aluminium mg/L	0.027	0.17	Result for Aluminium, Zinc and Reactive Phosphorous have increased since Event 17.
	Zinc mg/L	0.0024	0.005	
	Reactive Phosphorous mg/L	0.015	0.02	
SSC-IS	Aluminium mg/L	0.027	0.4	Result for Aluminium have decreased since Event 17.
	Lead mg/L	0.001	0.006	Results for Lead are elevated, which is atypical of this location.
	Zinc mg/L	0.0024	0.003	Results for Zinc and Total Suspended Solids have increased, when compared with previous events.
	Total Suspended Solids mg/L	0.2	6	
TR-RS	Aluminium mg/L	0.027	0.11	Result for Aluminium have increased since Event 17.
	Reactive Phosphorous mg/L	0.015	0.06	Results for Reactive Phosphorous have increased, when compared with previous sampling events.

CG-IS and LHG-IS displayed elevated values for total dissolved solids compared to the other sampling locations. Total suspended solids (TSS) at SSC-IS were above the 0.2 mg/L assigned DGV (refer to Figure 3-18).

Water temperatures ranged from 6.2 degrees Celsius at YK-IS (D/S) to 10.1 degrees Celsius at CG-IS.

Many of the results are recorded as below (<) the limit of detection. To enable calculation of the statistics, the *Limit of Detection Divided by Two (LOD/2) Method* (Cohen and Ryan 1989) has been applied. This data is provided in Appendix A.

The following figures, Figure 3-4 to Figure 3-33 display physico-chemical water quality through time for monitoring events 1 (March 2022) to 18 (August 2023). Where a DGV is available, these values are shown on the graph and have been included for dissolved oxygen (%), conductivity, pH and turbidity.

Although the Talbingo Reservoir is the ultimate catchment for both the Yarrangobilly River and tributaries, and Yorkers Creek and tributaries, the data has been divided into the Talbingo Reservoir catchment, which include the Talbingo Reservoir reference site sampling location and the Yarrangobilly River and its tributaries. These are all located in the Kosciuszko National Park. The Yorkers Creek catchment includes the three sampling locations along Yorkers Creek and New Zealand Gully, which are all located in the Bago State Forest. The confluence of Yorkers Creek with Tumut River (Talbingo Reservoir) is downstream of sampling location TR-RS but upstream of the confluence of the Yarrangobilly River and Tumut River.

Temperatures within the Talbingo Reservoir catchment have generally increased when compared with Event 17. TR-RS recorded a notable increase in temperature, from 4.0°C during Event 17 to 8.3°C during Event 18, refer to Figure 3-4. Temperatures within the Yorkers Creek catchment have also increased, refer to Figure 3-5.

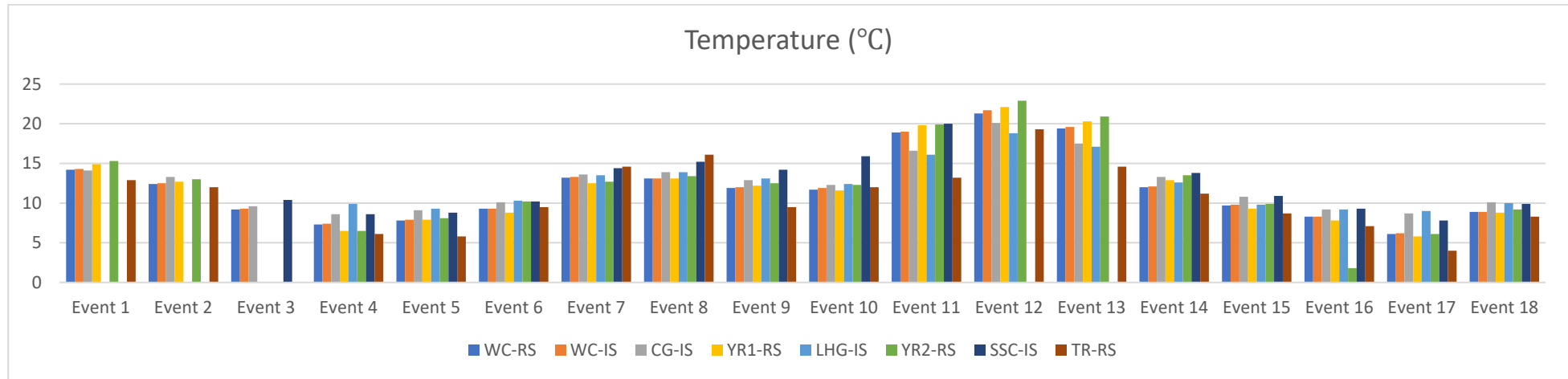


Figure 3-4 Temperature for Talbingo Reservoir catchment

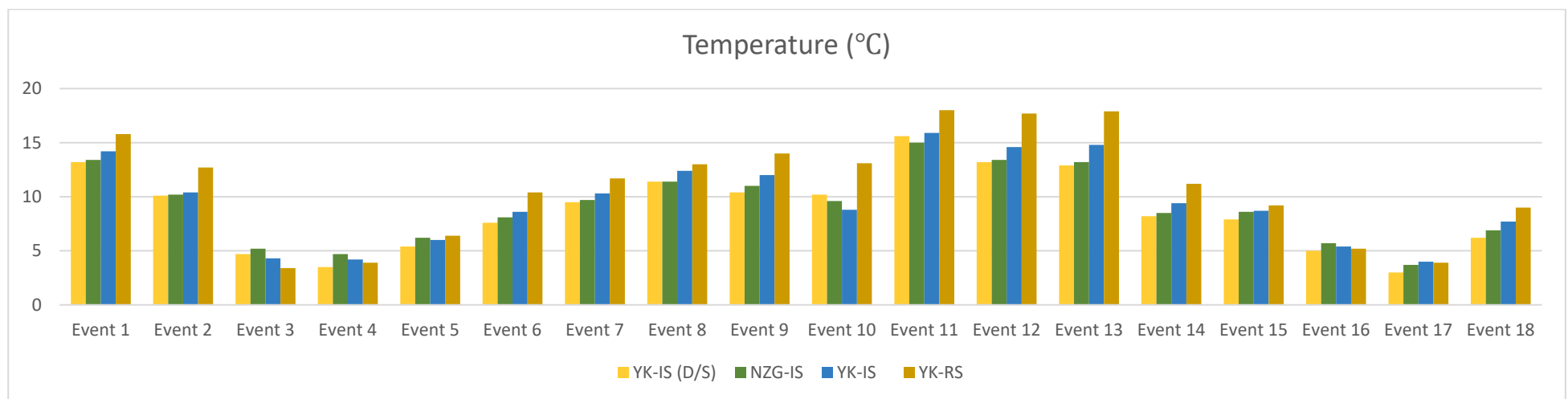


Figure 3-5 Temperature for Yorkers Creek catchment

DO (%) results for the Talbingo Reservoir catchment were within the acceptable DGV range (90-110%) for Event 18, refer to Figure 3-6. DO (%) results for the Yorkers Creek catchment were all below the lower DGV value (90%), refer to Figure 3-7.

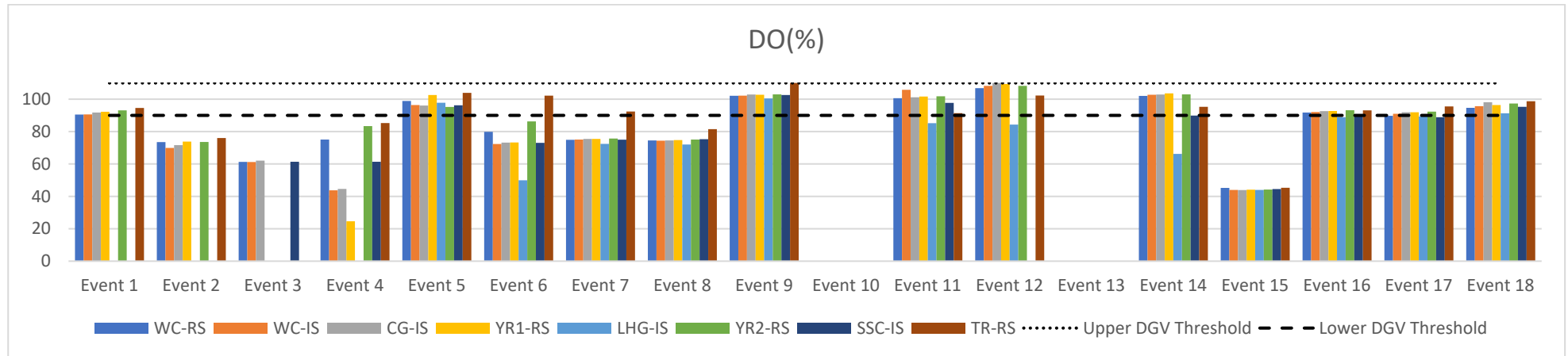


Figure 3-6 Dissolved oxygen (DO%) for Talbingo Reservoir catchment

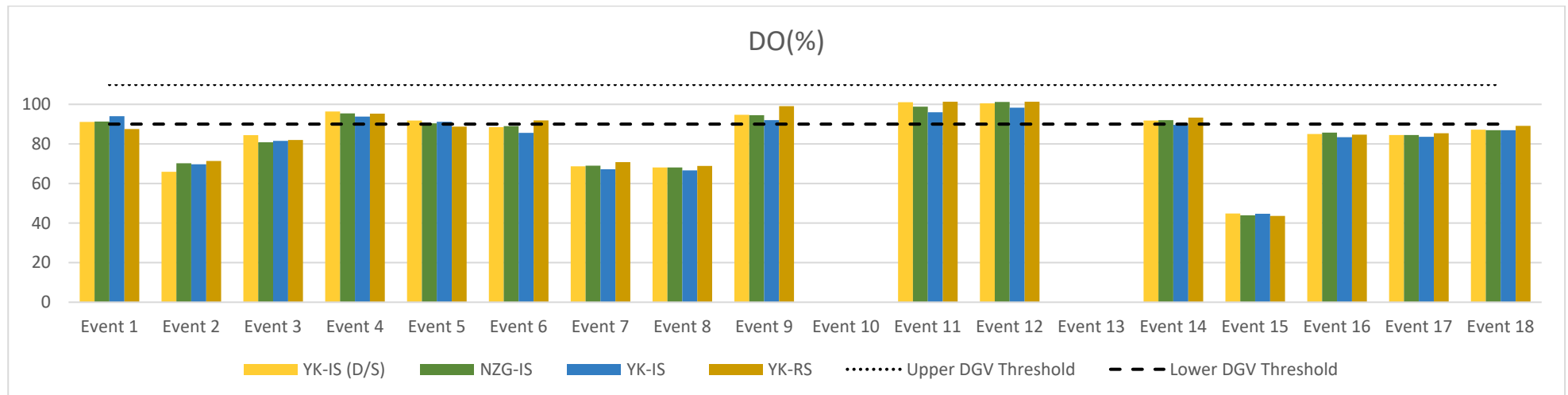


Figure 3-7 Dissolved oxygen (DO%) for Yorkers Creek catchment

The results for DO (ppm) for the Talbingo Reservoir catchment have remained relatively consistent with Event 17, refer to Figure 3-8. The highest reading for DO (ppm) was recorded at TR-RS (11.59 ppm). Results for DO (ppm) within the Yorkers Creek catchment have slightly decreased since Event 17; the highest reading for DO (ppm) was at YK-IS (D/S) (10.82 ppm), refer to Figure 3-9.

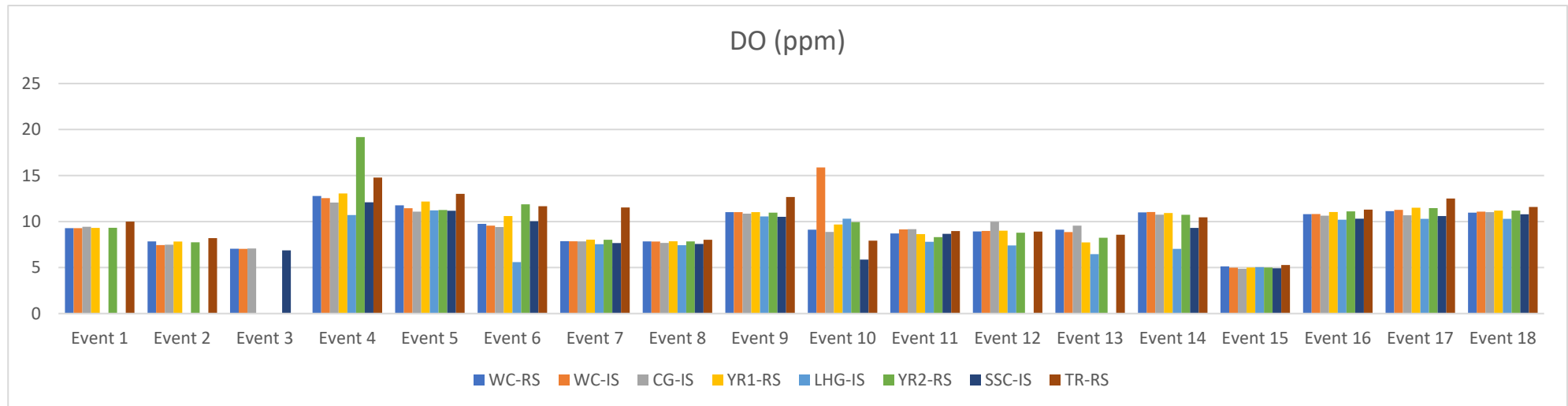


Figure 3-8 Dissolved Oxygen (ppm) for Talbingo Reservoir catchment

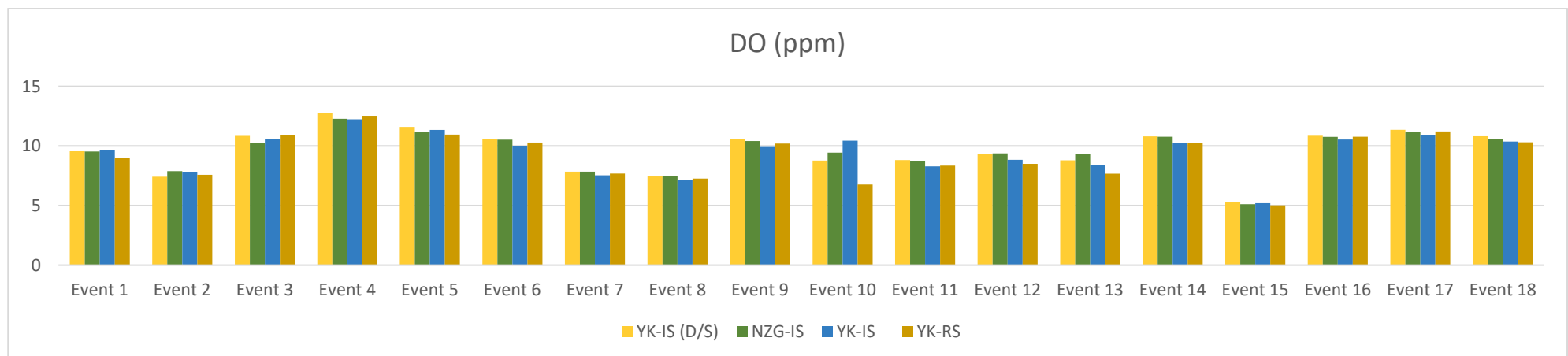


Figure 3-9 Dissolved Oxygen (ppm) for Yorkers Creek catchment

Results for specific conductance within the Talbingo Reservoir catchment have remained relatively consistent with Event 17, refer to Figure 3-10. LHG-IS and CG-IS returned elevated results of 553 $\mu\text{S}/\text{cm}$ and 517 $\mu\text{S}/\text{cm}$ for Event 18, respectively. Results for specific conductance within the Yorkers Creek catchment for Event 17 have slightly increased. The highest reading was 44.5 $\mu\text{S}/\text{cm}$ at NZG-IS, refer to Figure 3-11.

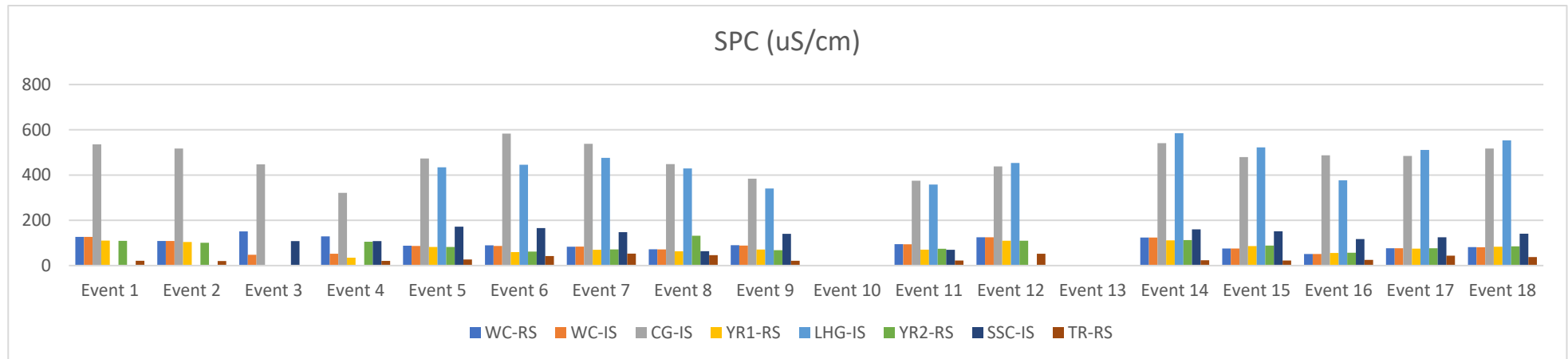


Figure 3-10 Specific Conductance (SPC $\mu\text{S}/\text{cm}$) for Talbingo Reservoir catchment

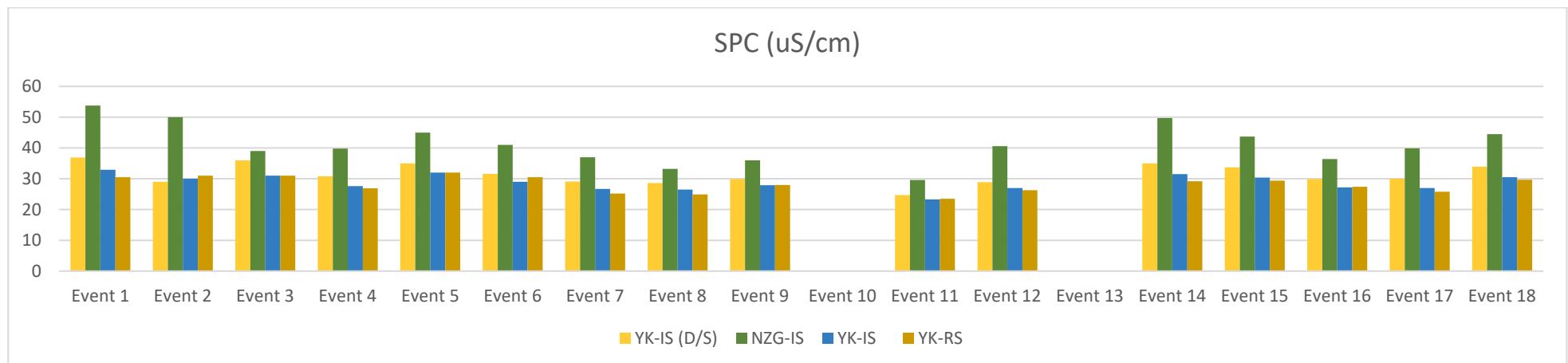


Figure 3-11 Specific Conductance (SPC $\mu\text{S}/\text{cm}$) for Yorkers Creek catchment

Conductivity readings within the Talbingo Reservoir catchment have slightly increased since Event 17, refer to Figure 3-12. Conductivity ($\mu\text{S}/\text{cm}$) results for CG-IS and LHG-IS continue to be notably higher than the other sites, with readings above the upper DGV value ($350 \mu\text{S}/\text{cm}$). Conductivity readings within the Yorkers Creek catchment have increased, refer to Figure 3-13. NZG-IS continues to return the highest reading for this catchment ($29.1 \mu\text{S}/\text{cm}$).

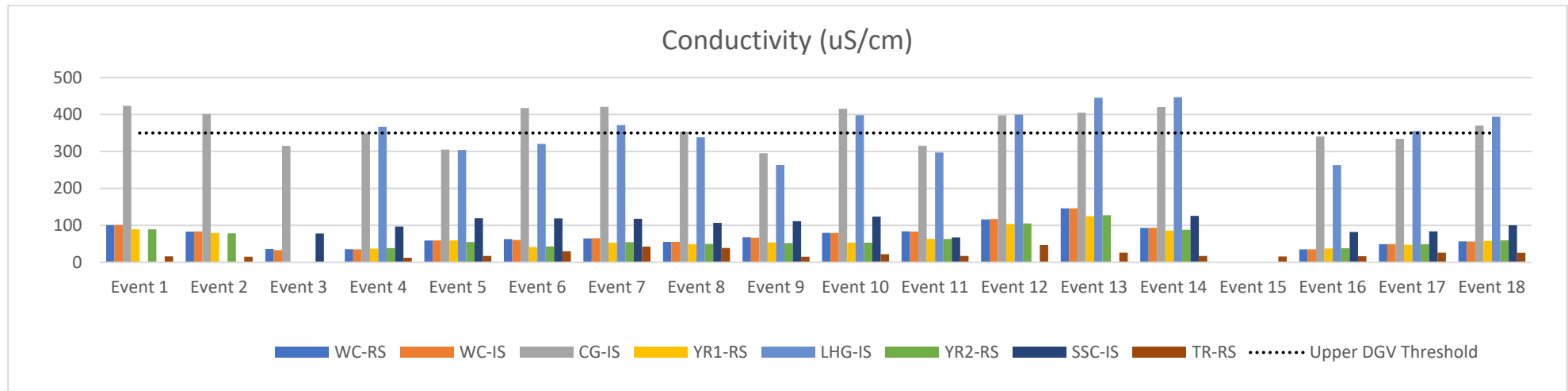


Figure 3-12 Conductivity ($\mu\text{S}/\text{cm}$) for Talbingo Reservoir catchment

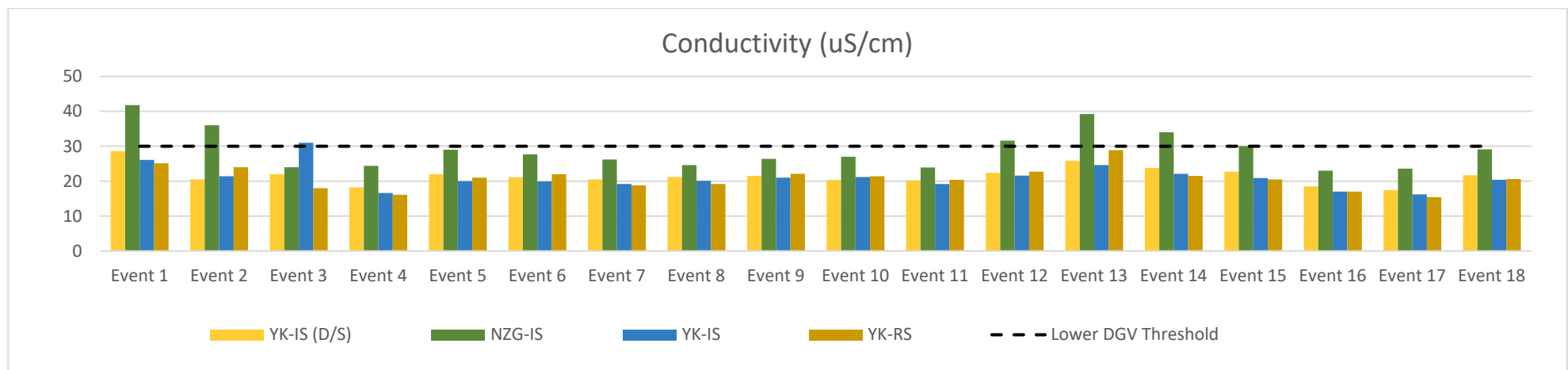


Figure 3-13 Conductivity ($\mu\text{S}/\text{cm}$) for Yorkers Creek catchment

Turbidity values were within the lower and upper DGV thresholds (2 - 25 NTU) for both catchments with the exception of CG-IS (0.41 NTU) for Event 18. Turbidity readings within the Talbingo Reservoir catchment have remained relatively consistent with Event 17, refer to Figure 3-14. Note that the results for CG-IS have been provided in Figure 3-15 to more accurately display the other sampling locations in the Talbingo reservoir catchment.

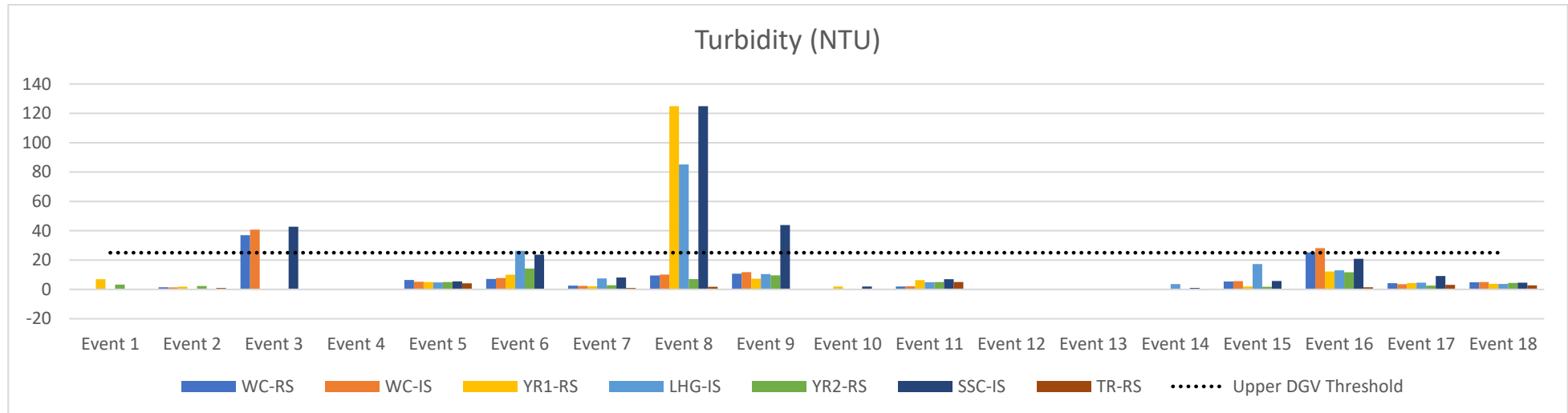


Figure 3-14 Turbidity (NTU) for the Talbingo Reservoir catchment

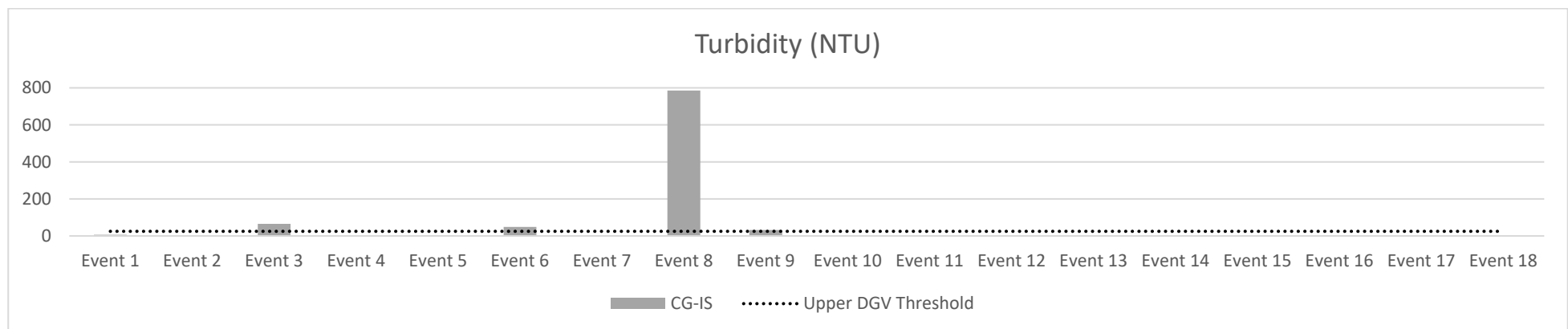


Figure 3-15 Turbidity (NTU) for CG-IS, within the Talbingo Reservoir catchment

Turbidity readings within the Yorkers Creek catchment have increased since Event 17, refer to Figure 3-16. YK-RS registered the highest reading (22.13 NTU).

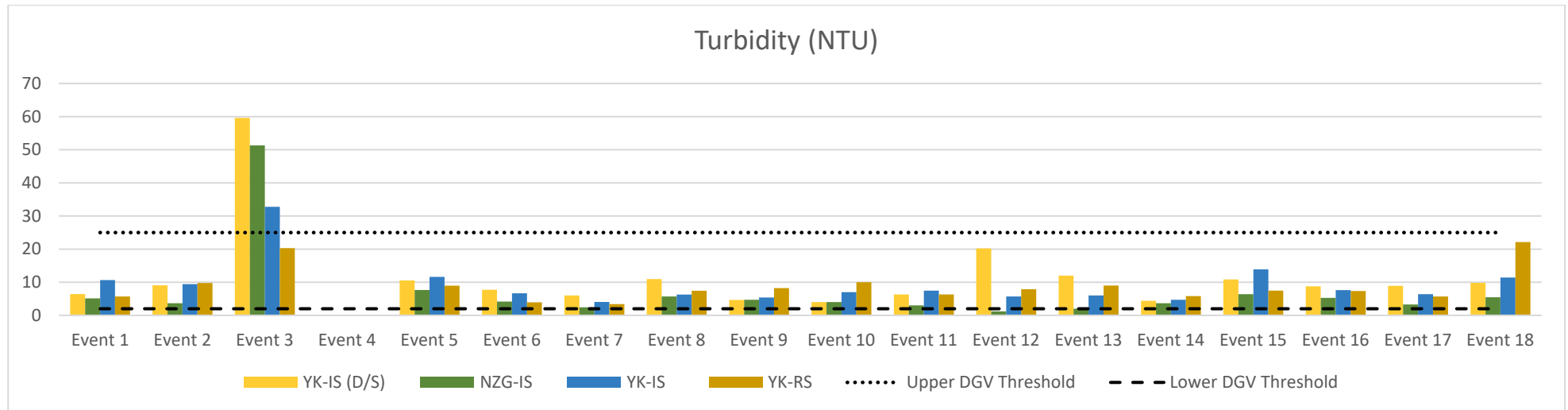


Figure 3-16 Turbidity (NTU) for the Yorkers Creek catchment

Results for total suspended solids (TSS) within the Talbingo Reservoir catchment for Event 18 were all below the Limit of Reporting (LOR), with the exception of SSC-IS (6 mg/L), refer to Figure 3-17. Similarly, results for CG-IS for Event 18 were below the LOR, refer to Figure 3-18.

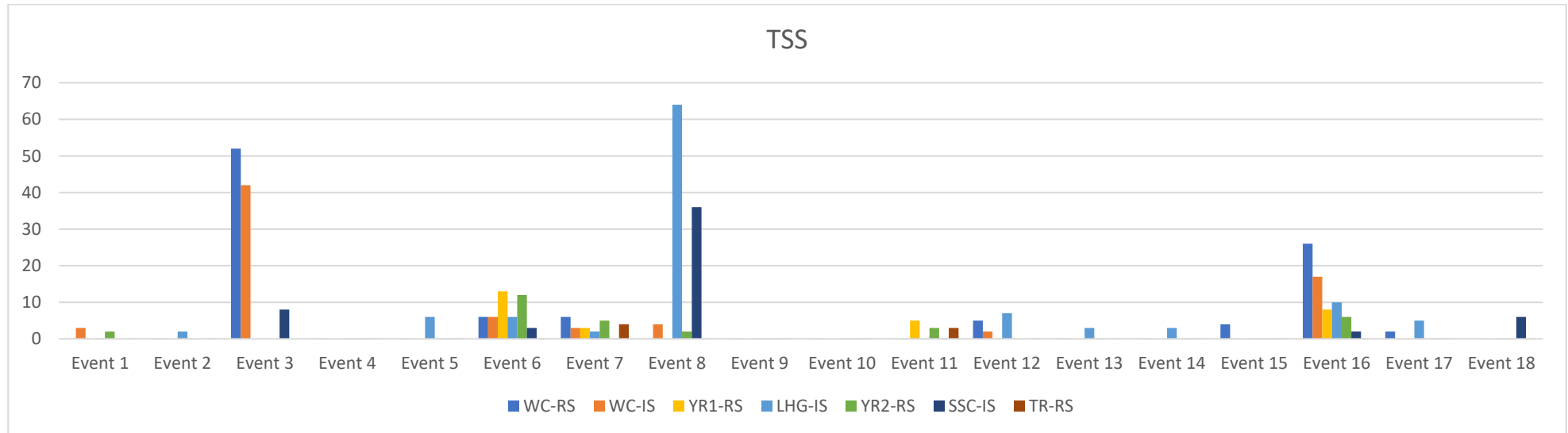


Figure 3-17 Total Suspended Solids for the Talbingo Reservoir catchment

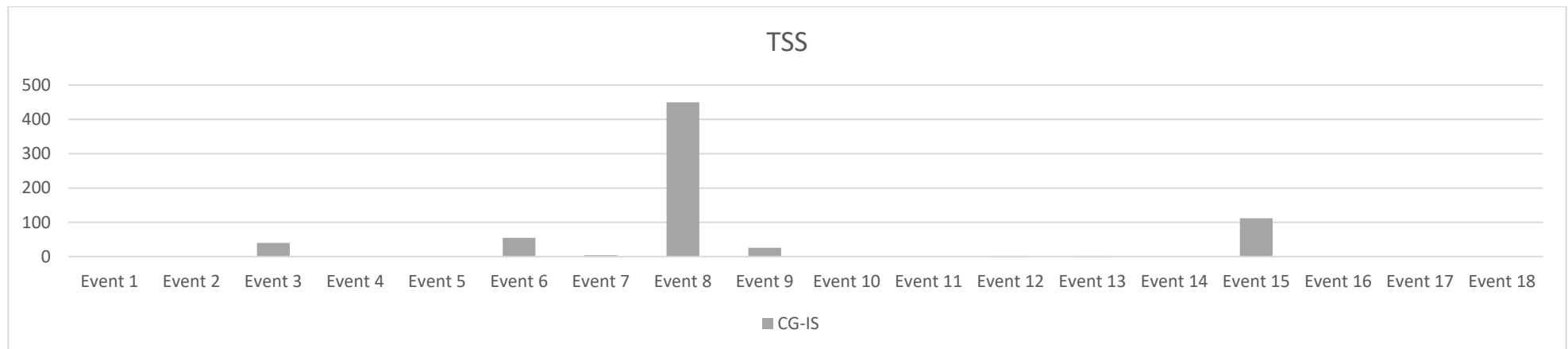


Figure 3-18 Total Suspended Solids for CG-IS, within the Talbingo Reservoir catchment

Results for total suspended solids were all below the LOR within the Yorkers Creek Catchment, refer to Figure 3-19.

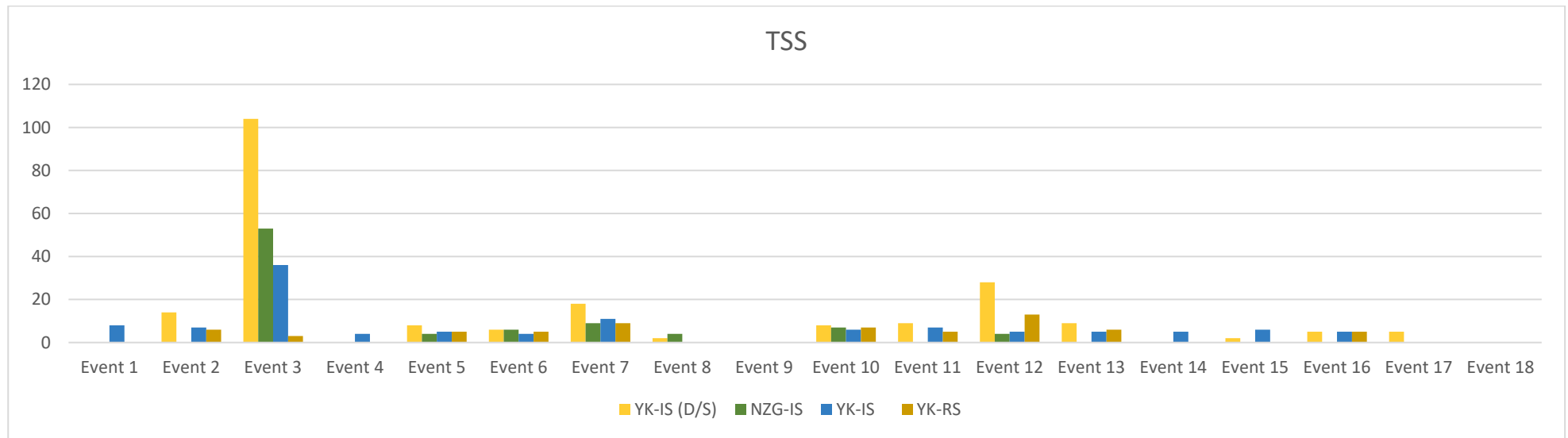


Figure 3-19 Total Suspended Solids for the Yorkers Creek catchment

Values of pH for the Talbingo Reservoir catchment have increased during Event 18. All sites had values of pH within the DGV range (6.5 – 8 pH units), refer to Figure 3-20. Values of pH for the Yorkers Creek catchment have increased at all sites apart from NZG-IS, which registered a decrease in pH units, refer to Figure 3-21. All sites had values of pH within the DGV range (6.5 – 8 pH units).

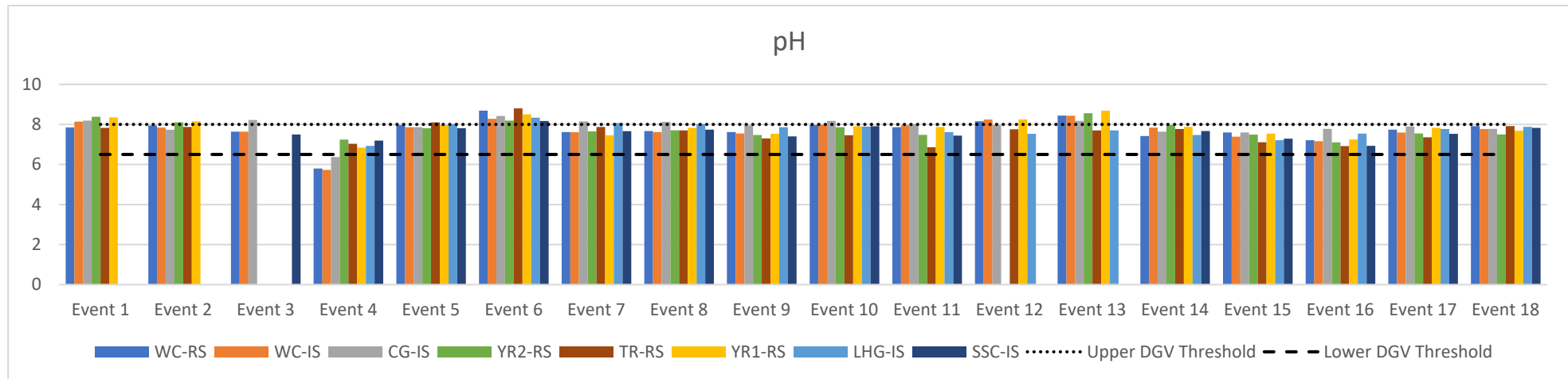


Figure 3-20 Potential of Hydrogen (pH) for Talbingo Reservoir catchment

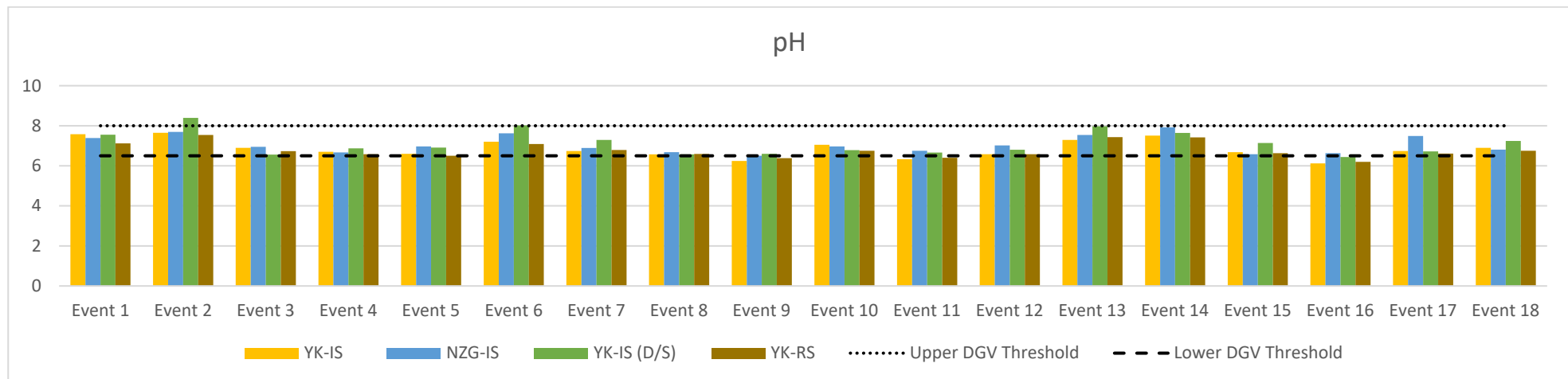


Figure 3-21 Potential of Hydrogen (pH) for Yorkers Creek catchment

The values for oxygen redox potential (ORP) within the Talbingo Reservoir catchment have increased at CG-IS, YR1-RS, YR2-RS and TR-RS, and decreased at WC-RS, WC-IS, LHG-IS and SSC-IS, refer to Figure 3-22. WC-RS recorded the most notable reduction in ORP, from 71.9 mV during Event 17 to 10.4 mV during Event 18. Within the Yorkers Creek catchment, ORP has increased at NZG-IS, and decreased at YK-IS (D/S), YK-IS and YK-RS, refer to Figure 3-23.

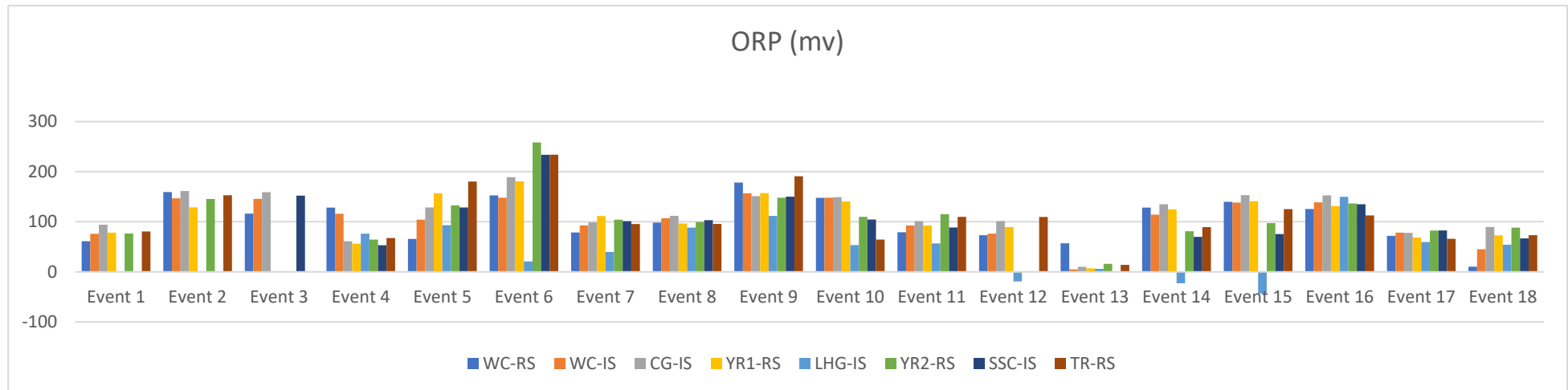


Figure 3-22 Oxygen Redox Potential (ORP) for Talbingo Reservoir catchment

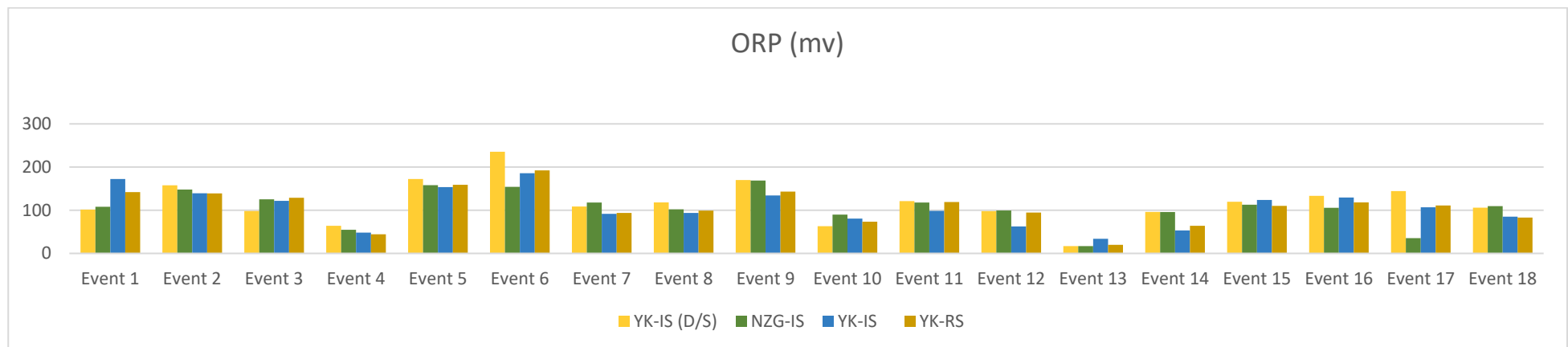


Figure 3-23 Oxygen Redox Potential (ORP) for Yorkers Creek catchment

Within the Talbingo Reservoir Catchment, Nitrogen Oxides (mg/L) were above the laboratory LOR at YR1-RS, LHG-IS, YR2-RS and TR-RS, refer to Figure 3-24. All results were below the DGV value of 0.15 mg/L. Similarly, results for the Yorkers Creek catchment were below the DGV (0.15 mg/L) across all sites, refer to Figure 3-25.

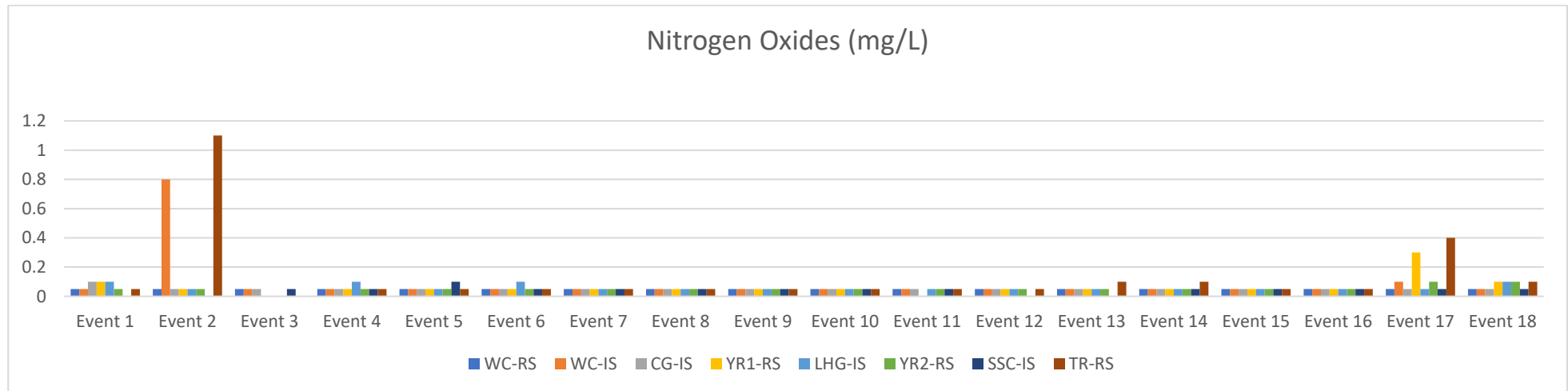


Figure 3-24 Nitrogen Oxides (mg/L) for the Talbingo Reservoir catchment

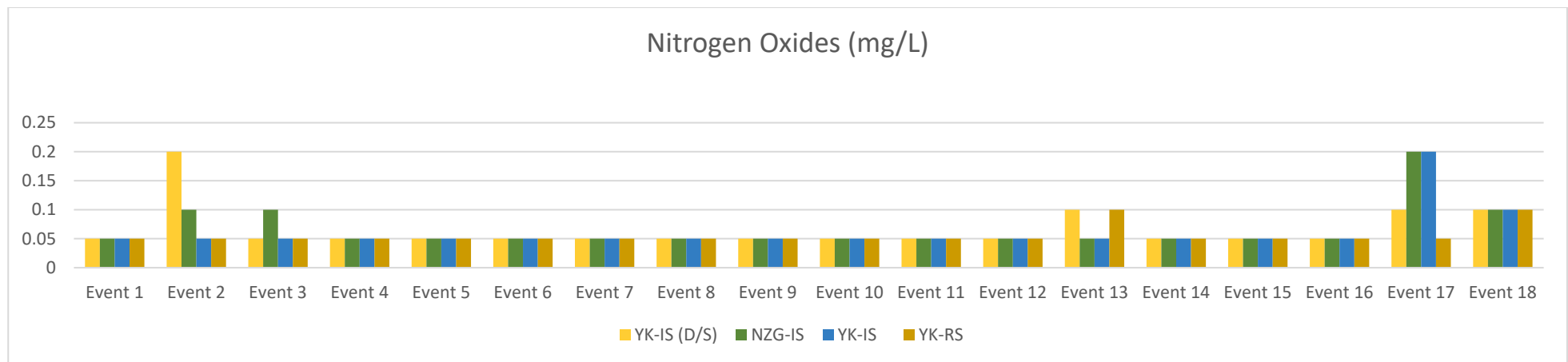


Figure 3-25 Nitrogen Oxides (mg/L) for the Yorkers Creek catchment

Reactive Phosphorous (mg/L) has notably increased at WC-IS, YR1-RS and TR-RS within the Talbingo Reservoir catchment, refer to Figure 3-26. A peak result of 0.09 mg/L was recorded at WC-IS. Results for Reactive Phosphorous notably increased at YK-RS (0.07 mg/L) within the Yorkers Creek catchment, refer to Figure 3-27.

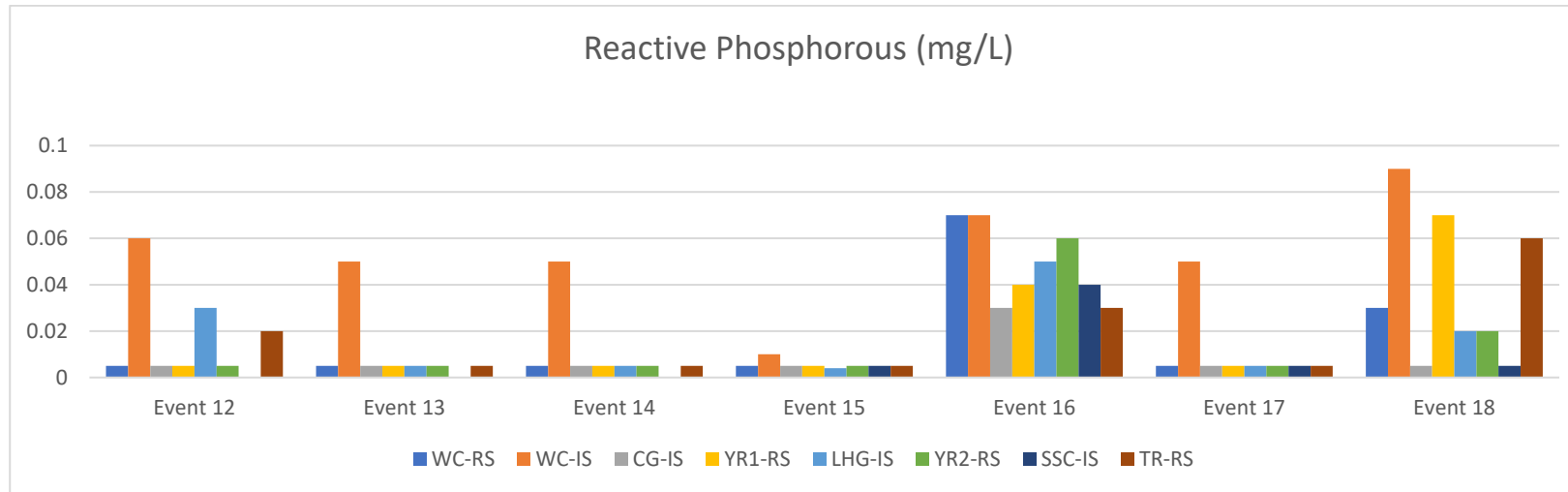


Figure 3-26 Reactive Phosphorous (mg/L) for the Talbingo Reservoir catchment

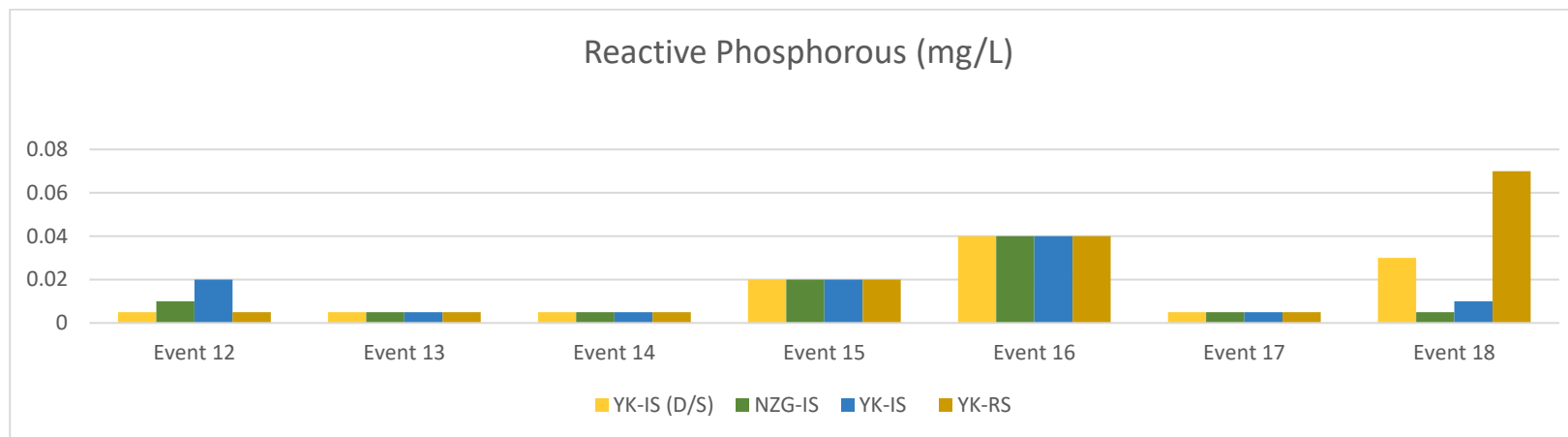


Figure 3-27 Reactive Phosphorous (mg/L) for the Yorkers Creek catchment

Total Hardness (CaCO_3 , mg/L) within the Talbingo Reservoir catchment has remained consistent, with results varying from very soft at TR-RS (10 mg/L) to hard at LHG-IS (304 mg/L), refer to Figure 3-28. Results for Total Hardness (CaCO_3 , mg/L) within the Yorkers Creek catchment were also consistent (very soft), ranging from 8 - 16 mg/L, refer to Figure 3-29.

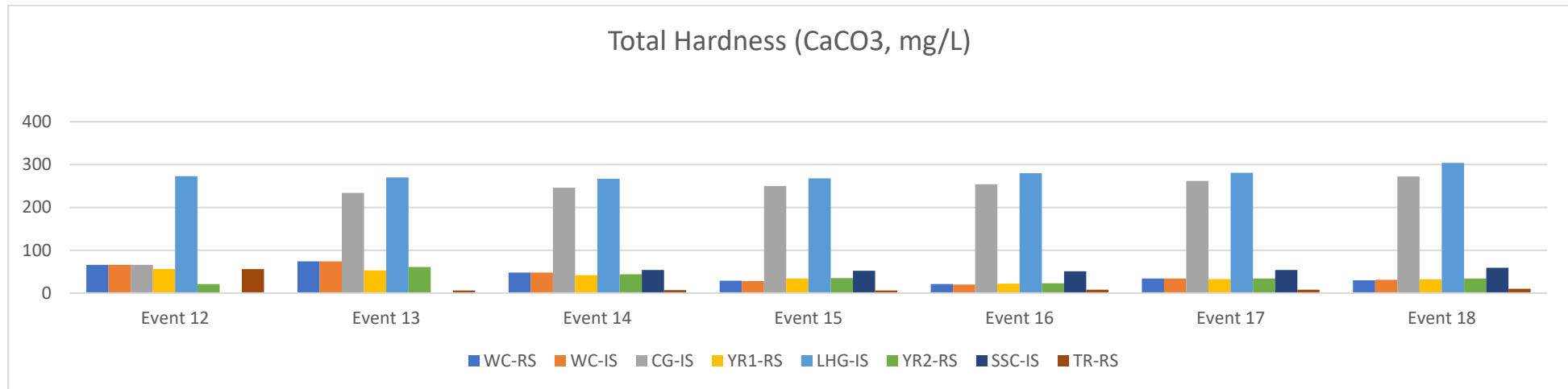


Figure 3-28 Total Hardness (CaCO_3) for the Talbingo Reservoir catchment

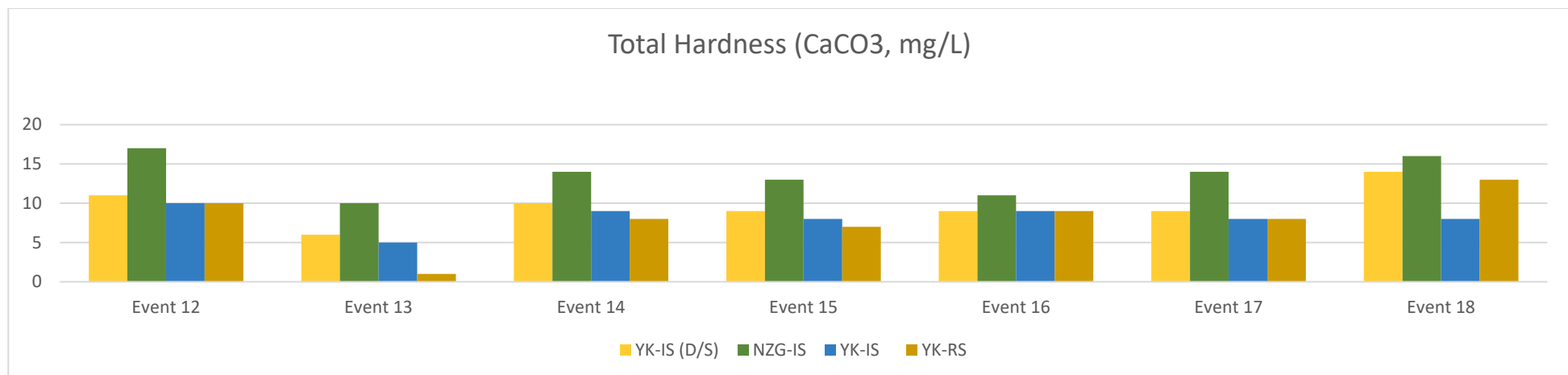


Figure 3-29 Total Hardness (CaCO_3) for the Yorkers Creek catchment

Results for Total Kjeldahl Nitrogen (TKN, mg/L) were below the LOR for all sites within the Talbingo Reservoir and Yorkers Creek catchments, refer to Figure 3-30 and Figure 3-31.

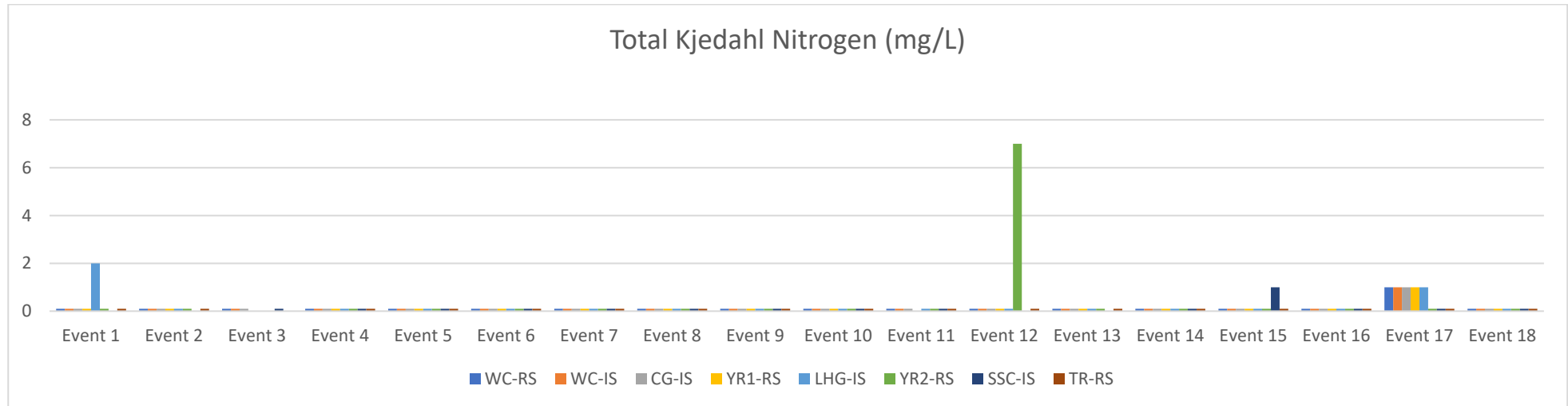


Figure 3-30 Total Kjeldahl Nitrogen (TKN) for the Talbingo Reservoir catchment

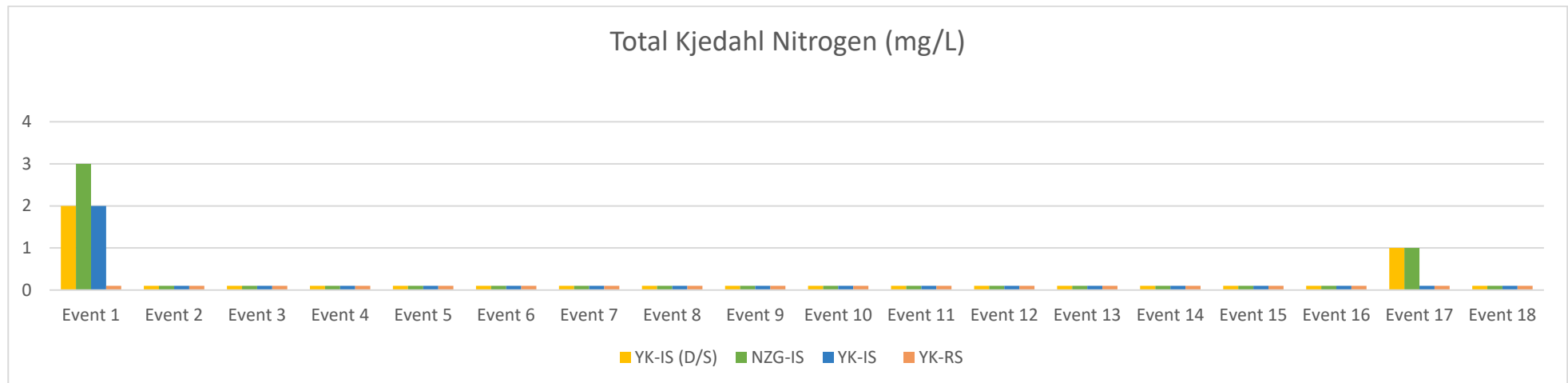


Figure 3-31 Total Kjeldahl Nitrogen (TKN) for the Yorkers Creek catchment

Ammonia (mg/L) levels were below the LOR for all sites within the Talbingo Reservoir and Yorkers Creek catchments for Event 18, refer to Figure 3-32 and Figure 3-33.

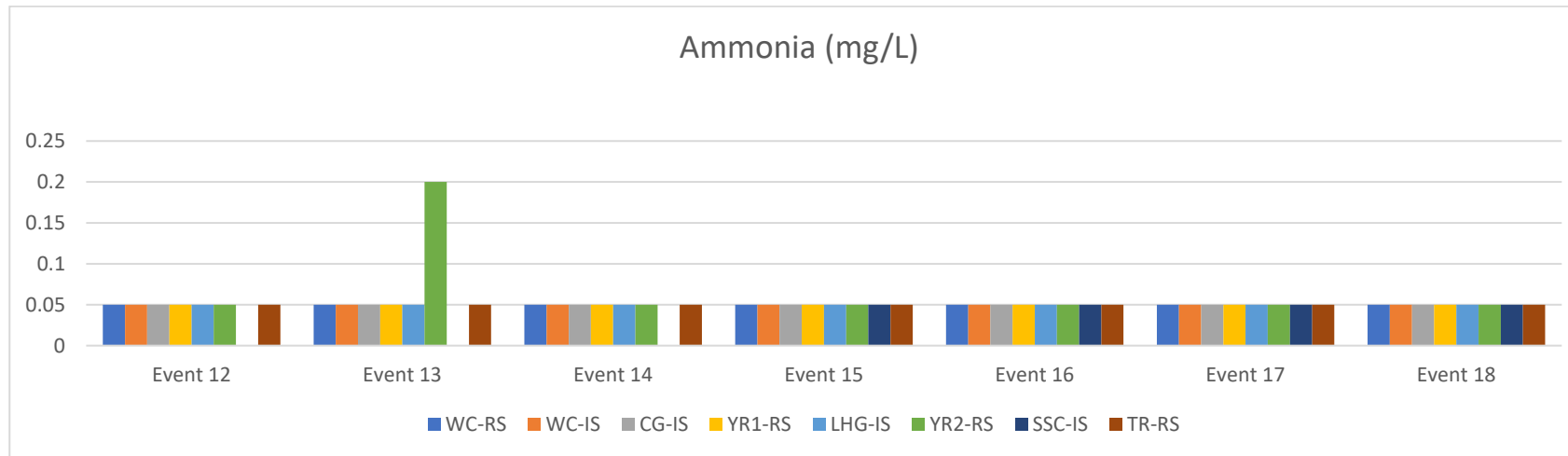


Figure 3-32 Ammonia (mg/L) for the Talbingo Reservoir catchment

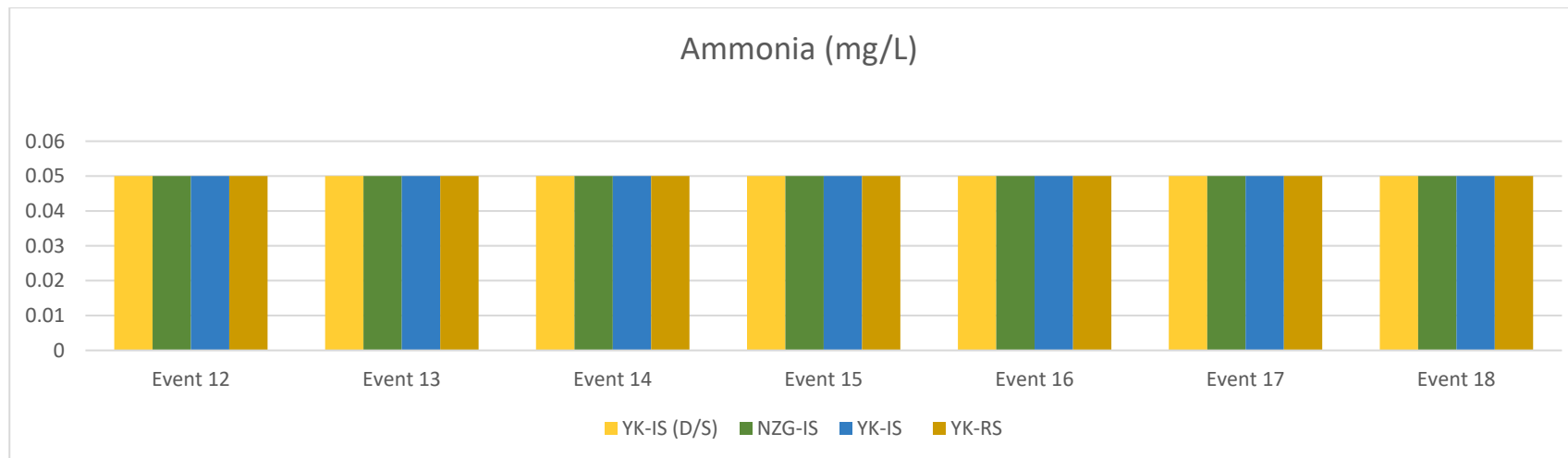


Figure 3-33 Ammonia (mg/L) for the Yorkers Creek catchment

3.1.2. Quality Assurance / Quality Control

A Quality Assurance and Quality Control (QA/QC) program was undertaken as part of this investigation including:

- A field duplicate sample, at a rate of one per 20 samples, was taken (DUP01) from the WQM site YK-RS on 29 August 2023. DUP01 was analysed for metals and metalloids. The duplicate sample has been compared against the YK-RS sample by Relative Percentage Difference (RPD) and has returned within an acceptable range (less than 30% for inorganic or less than 5 times the laboratory LOR).
- A water blank was supplied by the laboratory. The water blank sample was analysed for metals and metalloids. There were no exceedances of the sample results above the LORs.

NGH consider the QA/QC program to have been effective and the data reliable and representative to achieve the objectives of the investigation.

Refer to Appendix C for the laboratory analysis certificate, Appendix D for the RPD Table and Appendix E for the calibration certificates.

4. Conclusion

Water temperatures for Event 18 have increased across both catchments when compared to water temperatures for Event 17. This marks the first increase in temperature since Event 11 and can be attributed to seasonal changes.

Results for DO (%) and DO (ppm) slightly increased across both catchments during Event 18.

Similarly, specific conductance ($\mu\text{S}/\text{cm}$) and conductivity readings have slightly increased across both catchments when compared with results for Event 17. The pattern between sites is mostly reflective of the pattern for specific conductance.

pH has generally increased within the Talbingo Reservoir and Yorkers Creek catchments. All sites had values of pH within the DGV range (6.5 – 8 pH units).

Turbidity (NTU) readings have decreased across the Talbingo Reservoir catchment and increased within the Yorker's Creek catchment.

The values for oxygen redox potential (ORP) within the Talbingo Reservoir catchment increased at CG-IS, YR1-RS, YR2-RS and TR-RS, and decreased at WC-RS, WC-IS, LHG-IS and SSC-IS. Within the Yorkers Creek catchment, ORP has increased at NZG-IS, and decreased at YK-IS (D/S), YK-IS and YK-RS.

Results for TSS were below the laboratory LOR, with the exception of SSC-IS (6 mg/L).

Nitrogen Oxides (mg/L) were above the laboratory LOR at YR1-RS, LHG-IS, YR2-RS and TR-RS. Results for both sites were below the DGV (0.15 mg/L).

Reactive Phosphorous (mg/L) has notably increased at WC-IS, YR1-RS and TR-RS within the Talbingo Reservoir catchment. Similarly, results for Reactive Phosphorous notably increased at YK-RS (0.07 mg/L) within the Yorkers Creek catchment.

Total Hardness (CaCO_3) remained consistent within the Talbingo Reservoir catchment for Event 18, varying from very soft at TR-RS (10 mg/L) to hard at LHG-IS (304 mg/L). Similarly, total Hardness (CaCO_3) remained consistent within the Yorkers Creek catchment, ranging from 8 – 16 mg/L (very soft).

Results for Total Kjeldahl Nitrogen (TKN, mg/L) and Ammonia were below the laboratory LOR for all sites (both catchments).

Laboratory results for Event 18 were generally consistent with the results of the previous monitoring events, with the majority of analytes reported below the Limit of Reporting. Results exceeded the DGV for:

- Aluminium (0.027 mg/L) at all sites
- Iron (0.3 mg/L) at YK-RS and YK-IS
- Zinc (0.0024 mg/L) at CG-IS, LHG-IS, YK-IS (D/S), YK-RS, YR2-RS and SSC-IS
- Reactive Phosphorous (0.015 mg/L) at WC-RS, LHG-IS, WC-IS, YK-IS (D/S), YK-RS, YR1-RS, YR2-RS and TR-RS
- Lead (0.001 mg/L) at CG-IS, LHG-IS, NZG-IS, YR1-RS and SSC-IS
- Total suspended solids (0.2 mg/L) at SSC-IS
- Total dissolved solids were elevated at CG-IS and LHG-IS, which is a pattern that has carried through all events.

All results and statistics are provided in Appendix A.

5. References

- Jacobs Pty Ltd. 2020. *Snowy 2.0 Transmission Connection Project EIS*.
- NGH Pty Ltd. 2022. *Pre-construction Water Quality Monitoring Program and Methodology*.
- NGH Pty Ltd. 2022a. *Pre-construction Water Quality Monitoring Report: Event 1 April 2022*.
- NGH Pty Ltd. 2022b. *Pre-construction Water Quality Monitoring Report: Event 2 April 2022*.
- NGH Pty Ltd. 2022c. *Pre-construction Water Quality Monitoring Report: Event 3 May and June 2022*.
- NGH Pty Ltd. 2022d. *Pre-construction Water Quality Monitoring Report: Event 4 June 2022*.
- NGH Pty Ltd. 2022e. *Pre-construction Water Quality Monitoring Report: Event 5 July 2022*.
- NGH Pty Ltd. 2022f. *Pre-construction Water Quality Monitoring Report: Event 6 August 2022*.
- NGH Pty Ltd. 2022g. *Pre-construction Water Quality Monitoring Report: Event 7 October 2022*.
- NGH Pty Ltd. 2022h. *Pre-construction Water Quality Monitoring Report: Event 8 October 2022*.
- NGH Pty Ltd. 2022i. *Pre-construction Water Quality Monitoring Report: Event 9 November 2022*.
- NGH Pty Ltd. 2022j. *Pre-construction Water Quality Monitoring Report: Event 10 December 2022*.
- NGH Pty Ltd. 2023a. *Pre-construction Water Quality Monitoring Report: Event 11 January 2023*.
- NGH Pty Ltd. 2023b. *Pre- construction Water Quality Monitoring Report: Event 12 February 2023*.
- NGH Pty Ltd. 2023c. *Pre- construction Water Quality Monitoring Report: Event 13 March 2023*.
- NGH Pty Ltd. 2023d. *Pre- construction Water Quality Monitoring Report: Event 14 April 2023*.
- NGH Pty Ltd. 2023e. *Pre- construction Water Quality Monitoring Report: Event 15 June 2023*.
- NGH Pty Ltd. 2023f. *Pre- construction Water Quality Monitoring Report: Event 16 June 2023*.
- NGH Pty Ltd. 2023g. *Pre- construction Water Quality Monitoring Report: Event 16 June 2023*.
- TransGrid. 2021a. *Snowy 2.0 Transmission Connection Project Submissions Report*.
- TransGrid. 2021b. *Snowy 2.0 Transmission Connection Project Amendment Report*.

APPENDIX A EVENT DATA TABLE

22-911 Pre-construction WQRI

WC-RS (Partial Gridline View)

	Sheet cell gasoline	Temp (°C)	Dissolved Oxygen (mg/L)	DO (mg/L)	Specific EC (SPC uS/cm)	EC (uS/cm)	pH	Redox (mV)	Turbidity (NTU)	Al (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Cyanide (mg/L)	Fe (mg/L)	Pb (mg/L)	Mn (mg/L)	Hg (mg/L)	Ni (mg/L)	TN (mg/L)	TP (mg/L)	Ag (mg/L)	Zn (mg/L)	Ammonia (mg/L)	Nitrogen Oxide (mg/L)	Phosphorus (mg/L)	Reactive Phosphorus (mg/L)	Total Hardness (CaCO3)	Total Solids (TSS) (mg/L)	TDS (mg/L)	TSS (mg/L)	
WC-RS																																	
Event 1	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Event 2	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 3	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 4	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 5	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 6	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 7	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 8	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 9	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 10	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 11	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 12	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 13	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 14	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 15	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 16	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 17	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 18	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 19	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 20	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 21	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 22	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 23	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 24	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 25	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 26	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 27	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 28	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 29	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
Event 30	No	14.2	90.5	9.28	128.8	987.7	7.6	61.5	0.37	0.0001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.			

APPENDIX B OBSERVATIONS AND FIELD DATA

2023 / E18

22-013 Pre-construction WQM		Grease/oil/sheen	Temperature (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (ppm)	Specific Conductivity (SPC uS/cm)	Conductivity (uS/cm)	pH	Oxidation Reduction Potential (mV)	Turbidity (NTU)
WC-RS	Month	NO	8.9	94.7	10.97	81.6	56.5	7.92	10.4	4.85
	Comment	Clear, high flow								
WC-IS	Month	NO	8.9	95.7	11.08	81.3	56.4	7.77	45.2	5.01
	Comment	Clear, high fast flow								
CG-IS	Month	NO	10.1	98.1	11.02	517	369.9	7.78	89.7	0.41
	Comment	very clear, water vegetation								
YR1-RS	Month	8-8 NO	8.8	96.4	11.19	83.2	57.5	7.69	72.9	3.81
	Comment	Clear, high fast flow								

29th August: clear skies, no breeze

2023 / E18

22-013 Pre-construction WQM		Grease/oil/sheen	Temperature (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (ppm)	Specific Conductivity (SPC uS/cm)	Conductivity (uS/cm)	pH	Oxidation Reduction Potential (mV)	Turbidity (NTU)
NZG-IS	Month	NO	6.9	86.9	10.58	44.5	29.1	6.81	109.4	5.48
	Comment	clear, moderate flow, evident animal tracks on bank								
YK-IS	Month	6 NO	6.9 7.7	86.9 86.9	10.58 10.37	44 30.5	20.4	6.90	85.0	11.42
	Comment	moderate flow, cloudiness / opaqueness to water. shiny mineral deposits on bank and in water.								
YK-RS	Month	NO	9.0	89.1	10.31	29.7	20.6	6.75	83.0	22.13
	Comment	moderate flow, low water level, high sand deposit. cloudiness DUP01.								

APPENDIX C LABORATORY CERTIFICATES

NGH Environmental
35 Kincaid Street
Wagga Wagga NSW 2650
Attention: Nicola Smith

Tuesday, October 3, 2023



NATA Accredited Laboratory
Number: 9597

Accredited for compliance with
ISO/IEC 17025 - Testing

LABORATORY ANALYSIS REPORT

Report Number: 2308-0084

Page 1 of 17

For all enquiries related to this report please quote document number: 2308-0084

<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>
		30-August-2023
<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	M. Wyburn	30-August-2023

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
23Aug-0210	WC-RS 28.08.23 2.15pm	Aluminium (dissolved)	0.19 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	9.23 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	30 mg/L	LTM-W-038	2
		Iron (dissolved)	0.09 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	0.03 mg/L	LTM-W-030	0.01
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	5 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2

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Sample Type	Collected By	Date Received
Water	M. Wyburn	30-August-2023

EAL ID	Client ID. Date/Time sample taken	Test	Result (units)	Method Reference	Limit of Reporting
23Aug-0210	WC-RS 28.08.23 2.15pm	Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	0.003 mg/L	APHA 3030 B/3120 B	0.002
23Aug-0211	WC-IS 28.08.23 2.26pm	Aluminium (dissolved)	0.18 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	9.32 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	31 mg/L	LTM-W-038	2
		Iron (dissolved)	0.08 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	0.09 mg/L	LTM-W-030	0.01

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<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	M. Wyburn	30-August-2023

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
23Aug-0211	WC-IS 28.08.23 2.26pm	Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	21 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	0.003 mg/L	APHA 3030 B/3120 B	0.002
23Aug-0212	CG-IS 28.08.23 2.44pm	Aluminium (dissolved)	0.06 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	101 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	272 mg/L	LTM-W-038	2
		Iron (dissolved)	<0.01 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	0.004 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	4.81 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000

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Water	M. Wyburn	30-August-2023

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
23Aug-0212	CG-IS 28.08.23 2.44pm	Nickel (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01 mg/L	LTM-W-030	0.01
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	224 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	0.006 mg/L	APHA 3030 B/3120 B	0.002
23Aug-0213	YR1-RS 28.08.23 2.54pm	Aluminium (dissolved)	0.17 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	10.2 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	32 mg/L	LTM-W-038	2
		Iron (dissolved)	0.09 mg/L	APHA 3030 B/3120 B	0.01

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<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	M. Wyburn	30-August-2023

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
23Aug-0213	YR1-RS 28.08.23 2.54pm	Lead (dissolved)	0.005 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	0.07 mg/L	LTM-W-030	0.01
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	4 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.002
23Aug-0214	LHG-IS 28.08.23 3.09pm	Aluminium (dissolved)	0.14 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	112 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000

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Sample Type	Collected By	Date Received
Water	M. Wyburn	30-August-2023

EAL ID	Client ID. Date/Time sample taken	Test	Result (units)	Method Reference	Limit of Reporting
23Aug-0214	LHG-IS 28.08.23 3.09pm	Copper (dissolved)	0.003 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	304 mg/L	LTM-W-038	2
		Iron (dissolved)	0.07 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	0.007 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	5.82 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.009 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	0.004 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	0.02 mg/L	LTM-W-030	0.01
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	312 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	0.008 mg/L	APHA 3030 B/3120 B	0.002

23Aug-0215	YR2-RS 28.08.23 3.28pm	Aluminium (dissolved)	0.17 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1

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Sample Type	Collected By	Date Received
Water	M. Wyburn	30-August-2023

EAL ID	Client ID. Date/Time sample taken	Test	Result (units)	Method Reference	Limit of Reporting
23Aug-0215	YR2-RS 28.08.23 3.28pm				
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	10.7 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	34 mg/L	LTM-W-038	2
		Iron (dissolved)	0.09 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	0.02 mg/L	LTM-W-030	0.01
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	132 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	0.005 mg/L	APHA 3030 B/3120 B	0.002

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Water	M. Wyburn	30-August-2023

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
23Aug-0216	SSC-IS 28.08.23 3.38pm	Aluminium (dissolved)	0.40 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	14.6 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	59 mg/L	LTM-W-038	2
		Iron (dissolved)	0.15 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	0.006 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	5.50 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	0.003 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01 mg/L	LTM-W-030	0.01
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	<2 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2

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<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	M. Wyburn	30-August-2023

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
23Aug-0216	SSC-IS 28.08.23 3.38pm	Total Suspended Solids	6 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	0.003 mg/L	APHA 3030 B/3120 B	0.002
23Aug-0217	TR-RS 29.08.23 12.45pm	Aluminium (dissolved)	0.11 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	2.23 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	10 mg/L	LTM-W-038	2
		Iron (dissolved)	0.10 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.005 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	0.06 mg/L	LTM-W-030	0.01

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		30-August-2023

Sample Type	Collected By	Date Received
Water	M. Wyburn	30-August-2023

EAL ID	Client ID. Date/Time sample taken	Test	Result (units)	Method Reference	Limit of Reporting
23Aug-0217	TR-RS 29.08.23 12.45pm	Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	71 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.002
23Aug-0218	YK-IS (d/s) 29.08.23 1.10pm	Aluminium (dissolved)	0.36 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	3.28 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	14 mg/L	LTM-W-038	2
		Iron (dissolved)	0.24 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.012 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000

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Wagga Wagga NSW 2650
Attention: Nicola Smith

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		30-August-2023

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	M. Wyburn	30-August-2023

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
23Aug-0218	YK-IS (d/s) 29.08.23 1.10pm	Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	0.03 mg/L	LTM-W-030	0.01
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	19 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	0.022 mg/L	APHA 3030 B/3120 B	0.002
23Aug-0219	NZG-IS 29.08.23 1.29pm	Aluminium (dissolved)	0.22 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	3.48 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO3	16 mg/L	LTM-W-038	2
		Iron (dissolved)	0.14 mg/L	APHA 3030 B/3120 B	0.01

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		30-August-2023

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	M. Wyburn	30-August-2023

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
23Aug-0219	NZG-IS 29.08.23 1.29pm	Lead (dissolved)	0.004 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.004 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01 mg/L	LTM-W-030	0.01
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	<2 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	0.003 mg/L	APHA 3030 B/3120 B	0.002
23Aug-0220	YK-IS 29.08.23 1.40pm	Aluminium (dissolved)	0.48 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000

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		30-August-2023

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	M. Wyburn	30-August-2023

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
23Aug-0220	YK-IS 29.08.23 1.40pm	Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	8 mg/L	LTM-W-038	2
		Iron (dissolved)	0.31 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	0.003 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.008 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	0.01 mg/L	LTM-W-030	0.01
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	<2 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	0.005 mg/L	APHA 3030 B/3120 B	0.002

23Aug-0221	YK-RS 29.08.23 1.51pm	Aluminium (dissolved)	0.71 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1

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Facility:	Order #	Date Analysis Commenced
		30-August-2023

Sample Type	Collected By	Date Received
Water	M. Wyburn	30-August-2023

EAL ID	Client ID. Date/Time sample taken	Test	Result (units)	Method Reference	Limit of Reporting
23Aug-0221	YK-RS 29.08.23 1.51pm	Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	2.84 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO ₃	13 mg/L	LTM-W-038	2
		Iron (dissolved)	0.47 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.037 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	0.07 mg/L	LTM-W-030	0.01
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	5 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	0.026 mg/L	APHA 3030 B/3120 B	0.002

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		30-August-2023

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	M. Wyburn	30-August-2023

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
23Aug-0222	DUP01 29.08.23 1.51pm	Aluminium (dissolved)	0.72 mg/L	APHA 3030 B/3120 B	0.03
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Iron (dissolved)	0.49 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	0.001 mg/L	APHA 3030 B/3120 B	0.001
		Manganese (dissolved)	0.021 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	0.002 mg/L	APHA 3030 B/3120 B	0.001
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Zinc (dissolved)	0.007 mg/L	APHA 3030 B/3120 B	0.002

23Aug-0223	WATER BLANK	Aluminium (dissolved)	<0.03 mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1 mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003 mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002 mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001 mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002 mg/L	* APHA 4500-CN E	0.002

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<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	M. Wyburn	30-August-2023

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
23Aug-0223	WATER BLANK				
		Total Hardness as CaCO ₃	<2 mg/L	LTM-W-038	2
		Iron (dissolved)	<0.01 mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00 mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003 mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001 mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2 mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	0.1 mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01 mg/L	LTM-W-030	0.01
		Phosphorus, Total	<0.01 mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002 mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	<2 mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2 mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2 mg/L	APHA 2540 D	0.2
		Zinc (dissolved)	<0.002 mg/L	APHA 3030 B/3120 B	0.002

Note:

* NATA Accreditation does not cover the performance of this service.



Charles Sturt
University

ENVIRONMENTAL AND ANALYTICAL
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		30-August-2023
<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Water	M. Wyburn	30-August-2023
<u>EAL ID</u>	<u>Client ID.</u>	<u>Test</u>
	Date/Time sample taken	
		<u>Result (units)</u>
		<u>Method Reference</u>
		<u>Limit of Reporting</u>

Signed Michael Glazier, Laboratory Manager.

All samples analysed as received.
All soil results are reported on a dry basis.
The EAL takes no responsibility for the end use of results within this report.
This report shall not be reproduced except in full.
This report replaces any previously issued report

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CRICOS Provider Numbers for Charles Sturt University are 00005F (NSW), 01947G (VIC) and 02960B (ACT). ABN: 83 878 708 551



Charles Sturt
University

CLIENT:				ANALYTES REQUIRED Complete & tick as required												
CONTACT:																
ADDRESS:																
TELEPHONE:																
SAMPLE IDENTIFICATION	NATURE OF SAMPLE	DATE SAMPLED	E-mail	CONTAINER TYPE	NUMBER OF CONTAINERS	Total Nitrogen	Total Phosphorus	Cyanide	Total Suspended Solids	Total Dissolved Solids	Dissolved Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)	Total hardness	Ammonia	Reactive Phosphorus		
WC-RS	Water	28/8/23	2:15pm	JAR	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
WC-IS	Water	28/8/23	2:26pm	JAR	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CG-IS	Water	28/8/23	2:44pm	JAR	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
YR1-RS	Water	28/8/23	2:54pm	JAR	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
LHG-IS	Water	28/8/23	3:09pm	JAR	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
YR2-RS	Water	28/8/23	3:28pm	JAR	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
SSC-IS	Water	28/8/23	3:58pm	JAR	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TR-RS	Water	29/8/23	12:45pm	JAR	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
YK-IS (d/s)	Water	29/8/23	1:10pm	JAR	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
NZG-IS	Water	29/8/23	1:29pm	JAR	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
YK-IS	Water	29/8/23	1:40pm	JAR	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
YK-RS	Water	29/8/23	1:51pm	JAR	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
DUP01	Water	29/8/23	1:51pm	JAR	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
WATER BLANK	Water	-	-	JAR	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

RELINQUISHED BY:	NAME	SIGNATURE	ORGANISATION	DATE	TIME
Mode of Transport	Marchion Wagon	<i>[Signature]</i>	NGH Pty Ltd	28/8/23	3:30pm
Include Consignment Note # if applicable	Nicola Smith				

RECEIVED BY:	NAME	SIGNATURE	DATE	TIME
Delivery	5 it - 2	<i>[Signature]</i>	28/8/23	3:30pm
	EAL			

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CRICOS Provider Numbers for Client

44 ave 00005F (NSW), 01947G (VIC) and 02960B (ACT) AEN: 83 876 708 551

APPENDIX D RPD TABLE

DUP01

Water Blank

$$\text{RPD \% } |(X_2 - X_1)| / ((X_2 + X_1) / 2)$$

How to calculate the Relative Percent Difference (RPD)

The basic equation for RPD is $RPD = \frac{|R1 - R2|}{\left(\frac{R1 + R2}{2}\right)} \times 100,$

where
R1 is sample 1, and
R2 is sample 2.

R1 and R2 are your sample and duplicate values. Basically, this equation has you calculate the RPD by dividing the difference between the sample and duplicate by the average of the two. Using absolute value signs ensures the RPD doesn't end up as a negative percentage, which wouldn't make sense when looking for a percent difference.

The equation you plug into Excel looks like this:

=ABS((B3-C3)/AVERAGE(B3:C3)*100)

ABS stands for Absolute Value. Using the cell labels in the equation, as seen above (B3, C3), allows you to use the equation down for all your sample/duplicate pairs so you don't have to write a new equation each time. You can do this by clicking on the cell with the equation in it, then click and drag the bottom right corner of the cell down for the rest of your samples.

APPENDIX E CALIBRATION CERTIFICATES

Instrument	YSI Pro DSS
Serial No.	15J100066



Certificate of Calibration

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
7. Turbidity		100NTU		406442	99.7NTU
1. EC		2760mS		401089	2765mS
3. pH 4		pH 4.00		399527	pH 3.95
4. pH 7		pH 7.00		399304	pH 7.07
5. Temperature		22.9°C		Reading	22.9°C
6. DO		0%		399958	-0.1%
8. mV		233.62mV		A405006/B398193	232.4mV

Calibrated by: Amanda Neale

Calibration date: 21/08/2023

Next calibration due: 20/09/2023