Report

24 May 2024

To	Dirk Sanderson	**Contact No.**	PO 4501559263
From	Tegan Hopwood	**Project No.**	12640002
Project Name	Cadia surface water assessment		
Subject	Cadia surface water assessment - Belubula River		

Dear Dirk

1. Introduction

1.1 Background

Cadia Mine (Cadia) is a gold and copper mining and processing operation. Cadia is located approximately 25 km southwest of Orange, in the central tablelands of NSW. Cadia Holdings Pty Limited is the owner and operator of Cadia and is a wholly owned subsidiary of Newmont Corporation (Newmont), following the acquisition of Newcrest Mining Limited on 6 November 2023. Operations at Cadia occur under six Mining Leases (ML): ML1405, ML1449, ML1472, ML1481, ML1689 and ML1690.

Cadia comprises the Cadia Hill open cut (commenced in 1998 and completed in 2013), the Ridgeway underground mine (commenced in 2002) and the Cadia East underground mine (commenced in 2012). The site also maintains two waste rock emplacements (the rehabilitated North Waste Rock Dump (NWRD) and the active South Waste Rock Dump (SWRD)), as well as the Northern Tailings Storage Facility (NTSF), Southern Tailings Storage Facility (STSF) and Cadia Hill Pit TSF which commenced in 1998, 2002 and 2018, respectively. Newmont also operates the Cadia Dewatering Facility, located approximately 23.5 km to the east of Cadia, and east of the town of Blayney.

1.2 Scope of work

GHD Pty Ltd (GHD) were engaged by Cadia to undertake an assessment of surface water quality for two sites located on the Belubula River, upstream and downstream of Cadiangullong Creek, and provide a brief report of results to June 2023. The purpose of this report is to meet the internal and external reporting requirements for the 2022-2023 reporting period, which extends from 1 July 2022 to 30 June 2023.

Water quality data have been compared to the following guideline values:

– ANZECC (2000) livestock drinking water quality guidelines
– ANZECC (2000) irrigation guidelines, with long-term trigger values and values for sensitive crops applied as the most conservative values

Aquatic ecosystem monitoring of waterways within and surrounding Cadia has been undertaken for the reporting period as part of the Aquatic Ecosystem Monitoring Project.

1.3 Assumptions

All data received from Cadia Holdings Pty Ltd were assumed to be accurate, unless otherwise stated below. It is assumed that the collection methodology used for all sampling was appropriate to prevent contamination and that the holding times were adhered to.

1.4 Limitations

This report has been prepared by GHD for Cadia Holdings Pty Ltd and may only be used and relied on by Cadia Holdings Pty Ltd for the purpose agreed between GHD and Cadia Holdings Pty Ltd as set out in Section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Cadia Holdings Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

Where this report is relied on or used without obtaining this further advice from GHD, to the maximum extent permitted by law, GHD disclaims all liability and responsibility to any person in connection with, arising from or in respect of this report whether such liability arises in contract, tort (including negligence) or under statute.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Cadia Holdings Pty Ltd and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

2. Surface water assessment

2.1 Belubula River

The Belubula River is located to the south of Cadia, and flows in a westerly direction before joining the Lachlan River. The Belubula River receives water from Cadiangullong Creek, which flows in a southerly direction adjacent to Cadia.

The focus of this assessment is to identify potential impacts from Cadiangullong Creek on water quality in the Belubula River.

The following surface water sites are located on Belubula River:

– BRPS – located upstream of Cadiangullong Creek, downstream of Flyers Creek.
– CAWS71 – located downstream of Cadiangullong Creek and Flyers Creek.

2.2 Water quality

Summary statistics (minimum, median, and maximum values) for all analysed water quality parameters for data at upstream site BRPS and downstream site CAWS71 are presented in Table 2.1. Data analysed are for the period from January 2021 to June 2023, however it is noted that routine monitoring at CAWS71 did not commence until February 2022. No data are available for downstream site CAWS71 between February 2021 and February 2022, or in November and December 2022. These statistics have been compared to the ANZECC (2000) guideline for livestock drinking water, and the ANZECC (2000) guideline for irrigation. As outlined in Section 1.2, the lowest applicable guideline values for each analyte have been selected for comparison in this report, as the most conservative (lowest risk) values.

Total phosphorus (TP) was above the ANZECC (2000) irrigation guideline value at upstream site BRPS in the maximum value (and equal to the guideline in the median value), and above the guideline at downstream site CAWS71 in the median and maximum values. Therefore, approximately half of the TP concentrations reported for both sites were above the guideline value as shown in Appendix A. This guideline is for the prevention of bioclogging (clogging of irrigation infrastructure due to excessive algae or microbial growth) only. It is also the value for long-term (100 years) of irrigation, and is therefore considered to be of very low risk. All TP values at both BRPS and CAWS71 were below the short-term (20 years of irrigation) trigger value of 0.80 mg/L.

Similarly, dissolved iron was above the ANZECC (2000) long term irrigation guideline value at both upstream site BRPS and downstream site CAWS71 in the maximum values but below the short-term guideline value of 10 mg/L. All exceedances occurred in 2021 and 2022 and there have been no exceedances in 2023. The upstream dissolved iron concentrations were slightly higher than the downstream concentrations.

pH at downstream site CAWS71 exceeded the upper bound of the recommended pH range on one occasion (in 2022). The recommended pH range is to limit corrosion and fouling of pumping infrastructure for irrigation and stock watering systems. The pH graph in Appendix A suggests that this pH value is an outlier. No other pH exceedances were recorded.

All other water quality parameters were below both the ANZECC (2000) livestock and irrigation guideline values in all samples collected during the historical monitoring period at both the upstream and downstream Belubula River sites.

Further analysis of key water quality parameters, including comparison of results between the upstream (BRPS) and downstream (CAWS71) sites on the Belubula River are provided in sections 2.2.1 to 2.2.4 below. Time series figures for all analysed parameters have also been presented in Appendix A.

Table 2.1 ***Summary statistics for water quality results at BRPS and CAWS71, January 2021 to June 2023. All units are in mg/L unless otherwise stated.***

Analyte	BRPS			CAWS71			ANZECC 2000	
Site	**Min**	**Median**	**Max**	**Min**	**Median**	**Max**	**Livestock**	**Irrigation [a]**
Physicochemical parameters								
Electrical Conductivity (EC) - Field (µS/cm)	221.9	457.0	724.3	244.1	540.0	770.1	NA	950 [b]
pH - Field (pH units)	7.22	8.13	8.50	7.17	8.09	10.80	NA	6-9
Redox Potential (mV)	51	275	340	24	262	335	NA	NA
Suspended Solids	<5	8	119	<5	6	52	NA	NA
Temperature (°C)	7.6	17.4	26.7	5.3	19.5	24.4	NA	NA
Total Dissolved Solids	178	279	469	155	302	495	2000 [c]	NA
Major ions								
Bicarbonate alkalinity	75	175	227	67	192	234	NA	NA
Calcium	17	39	67	19	41	69	1000	NA
Carbonate alkalinity	<1	<1	15	<1	<1	16	NA	NA
Chloride	16	33	63	12	39	63	NA	175 [b]
Hydroxide alkalinity	<1	<1	<1	<1	<1	<1	NA	NA
Magnesium	9	22	38	9	25	40	NA	NA
Potassium	2	3	6	2	3	6	NA	NA
Sodium	14	27	47	13	31	49	NA	115 [b]
Sulfate	14	40	114	16	50	137	1000	NA
Total alkalinity	75	178	235	67	193	236	NA	NA
Total hardness	80	183	324	84	201	337	NA	NA
Nutrients								
Nitrate as N	<0.01	0.13	0.53	<0.01	0.07	0.30	90.3 [e]	NA
Nitrite + Nitrate	<0.01	0.13	0.54	<0.01	0.07	0.30	NA	NA
Nitrite as N	<0.01	<0.01	0.02	<0.01	<0.01	0.02	9.1 [f]	NA
Total Kjeldahl Nitrogen	0.4	0.7	2.2	0.1	0.6	1.2	NA	NA
Total nitrogen	0.4	0.9	2.6	0.1	0.7	1.5	NA	5
Total phosphorus	0.02	0.05	0.24	0.02	0.06	0.26	NA	0.05 [d]
Dissolved metals								
Aluminium	<0.01	<0.01	0.34	<0.01	<0.01	0.40	5	5
Antimony	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA
Arsenic	<0.001	0.004	0.013	<0.001	0.006	0.014	0.5	0.1
Cadmium	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.01
Chromium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1	0.1
Cobalt	<0.001	<0.001	0.003	<0.001	<0.001	0.003	1	0.05
Copper	<0.001	<0.001	0.003	<0.001	<0.001	0.010	0.4	0.2
Iron	<0.05	0.15	0.62	<0.05	0.06	0.58	NA	0.2
Lead	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.1	2
Manganese	0.016	0.029	0.141	0.014	0.025	0.046	NA	0.2

Analyte	BRPS			CAWS71			ANZECC 2000	
Site	Min	Median	Max	Min	Median	Max	Livestock	Irrigation [a]
Mercury	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.002	0.002
Molybdenum	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.15	0.01
Nickel	<0.001	<0.001	0.002	<0.001	<0.001	0.007	1	0.2
Selenium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.02
Silver	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA
Zinc	<0.005	<0.005	0.011	<0.005	<0.005	0.02	20	2

[a] Long-term (100 years) irrigation values used, as the most conservative value
[b] Value for sensitive crops used, as the most conservative value
[c] Most sensitive animal (poultry) value applied
[d] To minimise bioclogging of irrigation equipment only
[e] Nitrate guideline is 400 mg/L. Converted to nitrate as N.
[f] Nitrite guideline is 30 mg/L. Converted to nitrite as N.
Values in yellow are higher than the ANZECC (2000) irrigation guideline value

2.2.1 Physicochemical parameters

Field pH results recorded in the Belubula River were generally slightly alkaline, with most results during the January 2021 to June 2023 reporting period within the 7.5 to 9.0 range. Most pH results were very similar at sites upstream (BRPS) and downstream (CAWS71) of the Cadiangullong Creek confluence throughout the historical monitoring period. There was one elevated pH result observed at CAWS71 in June 2022, however, all subsequent results had returned to within the usual range.

Field electrical conductivity (EC) fluctuated at both sites across the historical monitoring period, with the highest EC results observed at both sites during early-2023 (Figure 2.1). One EC result (4025 µS/cm at BRPS in July 2022) was assumed to be incorrect as it did not match the laboratory result, and was consequently removed from the dataset.

A seasonal pattern in EC results was observed at both sites, with EC generally higher during the post-summer months (March and April in 2022, and February, March and April in 2023) and lower during the post-winter months (July to December). A weak relationship between EC and rainfall was observed during the 2022-2023 reporting period, with EC lowest between August and November 2022, when rainfall in the study area was well above average (refer Figure 2.1 in GHD 2023). Rainfall was also above average between February and April 2023 when EC results were at their highest, however, this is likely to have been influenced by lower rainfall in December 2022 to January 2023, coupled with increased evapoconcentration during the summer period. EC results were similar between the sites during most sampling events, although EC results in the January to June 2023 period were slightly higher at downstream site CAWS71 than upstream site BRPS. All results at both sites were well below the conservative guideline value for irrigation.

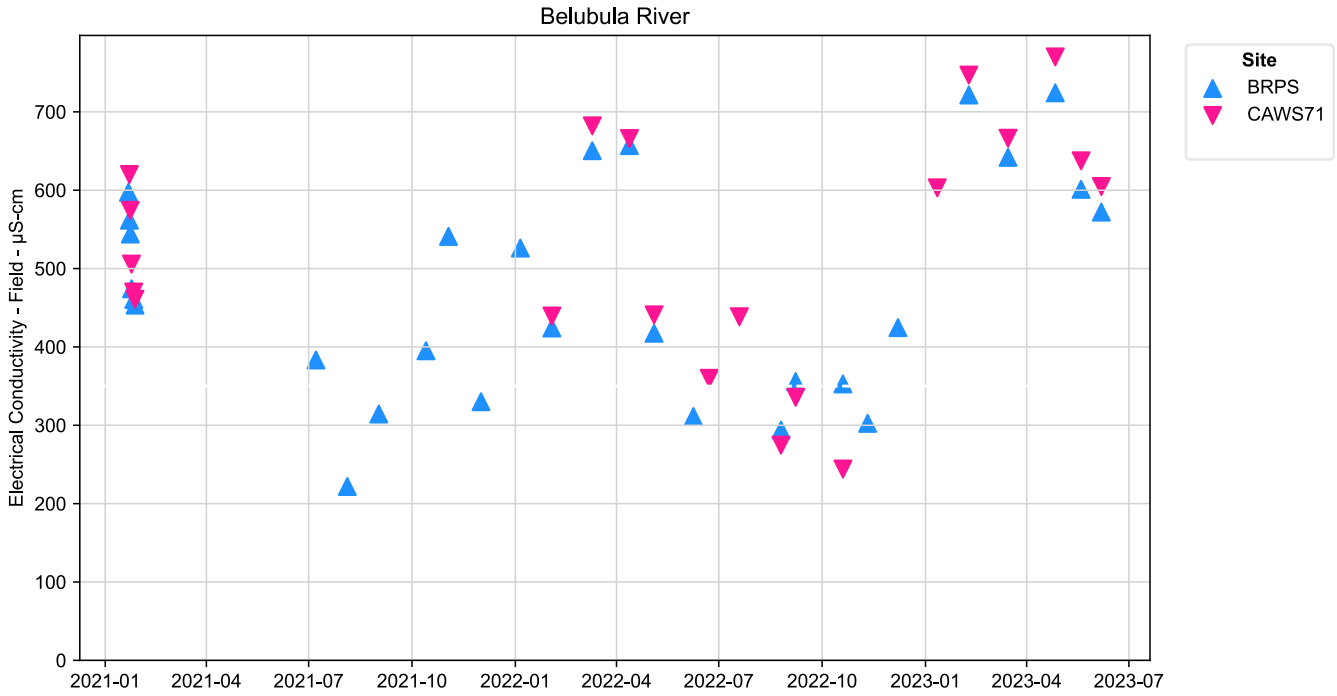


Figure 2.1 EC levels in the Belubula River

Total suspended solids (TSS) concentrations were generally low (<20 mg/L) at both sites, although infrequent elevated concentrations were observed between mid-2021 and mid-2022, most commonly at upstream site BRPS. Most TSS results were similar between the sites during events in which samples were collected from both sites. TSS results were frequently lowest from late-2022 to 2023.

2.2.2 Nutrients

Concentrations of nutrients have remained consistent at both BRPS and CAWS71 across the historical monitoring period, with all results during the 2022-2023 reporting period within the historical range of results. Concentrations of nitrate (and nitrate + nitrite) were lowest in January 2021, March 2022 and January to May 2023 at both sites, while concentrations were highest in August and September 2021 (BRPS only) and in mid-2022 (both sites).

Similar to nitrate concentrations, total nitrogen (TN) and total Kjeldahl nitrogen (TKN) concentrations were lower in early 2023 at both sites compared to most historical results. All nitrogen results were well below the relevant livestock and irrigation guideline values.

TP concentrations were also low in 2023 compared to some historical results, with the highest concentrations observed at both sites in 2021. As shown by the time series graph in Appendix A, TP concentrations at both sites have generally been decreasing over the past two years. As stated previously, approximately half of the TP concentrations reported for both sites over the monitoring period were above the long-term (100 years) irrigation guideline value for the prevention of bioclogging (clogging of irrigation infrastructure due to excessive algae or microbial growth). All TP values at both BRPS and CAWS71 were below the short-term (20 years of irrigation) trigger value of 0.80 mg/L.

TN, TKN and TP concentrations were similar between the two sites during all sampling events.

2.2.3 Major ion composition

Concentrations of most major ions (excluding potassium) followed a similar seasonal pattern, with the highest concentrations observed in February to April 2023, followed by March and April 2022. Concentrations of all of these major ions were slightly (less than 10 percent) higher at downstream site CAWS71 than upstream site BRPS. Potassium concentrations indicated no temporal pattern, with the highest concentrations observed at both sites in early 2021. Sulfate was higher at downstream site CAWS71 than upstream site BRPS in most samples of the historical monitoring period, particularly during the January to June 2023 period, although sulfate concentrations at both sites followed similar trends over the monitoring period and were well below the livestock guideline value.

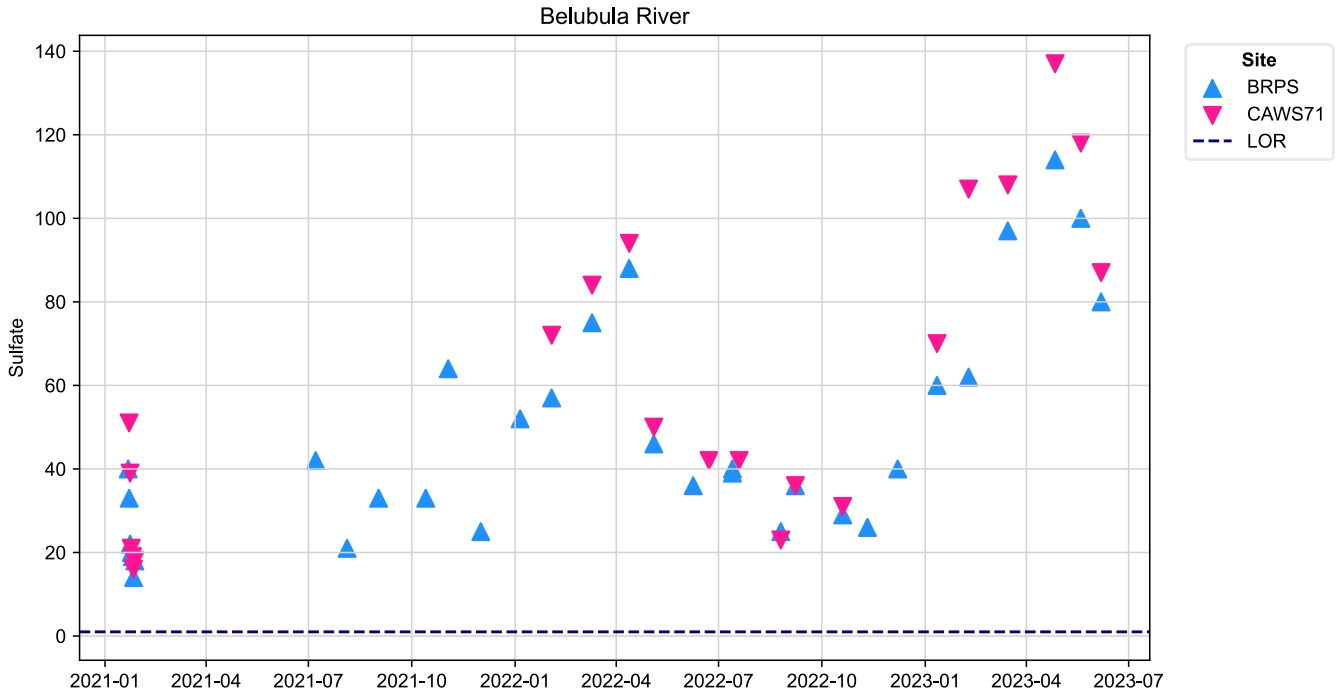


Figure 2.2 Sulfate concentrations in the Belubula River

The piper plot in Figure 2.3 shows the ionic composition of Belubula River sites during the historical monitoring period, based on calculations of the median concentrations of each major ion for each time period (January 2021 to June 2022, and July 2022 to June 2023). The ionic composition of water at BRPS and CAWS71 was similar between sites and sampling period. Water at both sites demonstrated a mixed cation composition and a dominance of the bicarbonate anion.

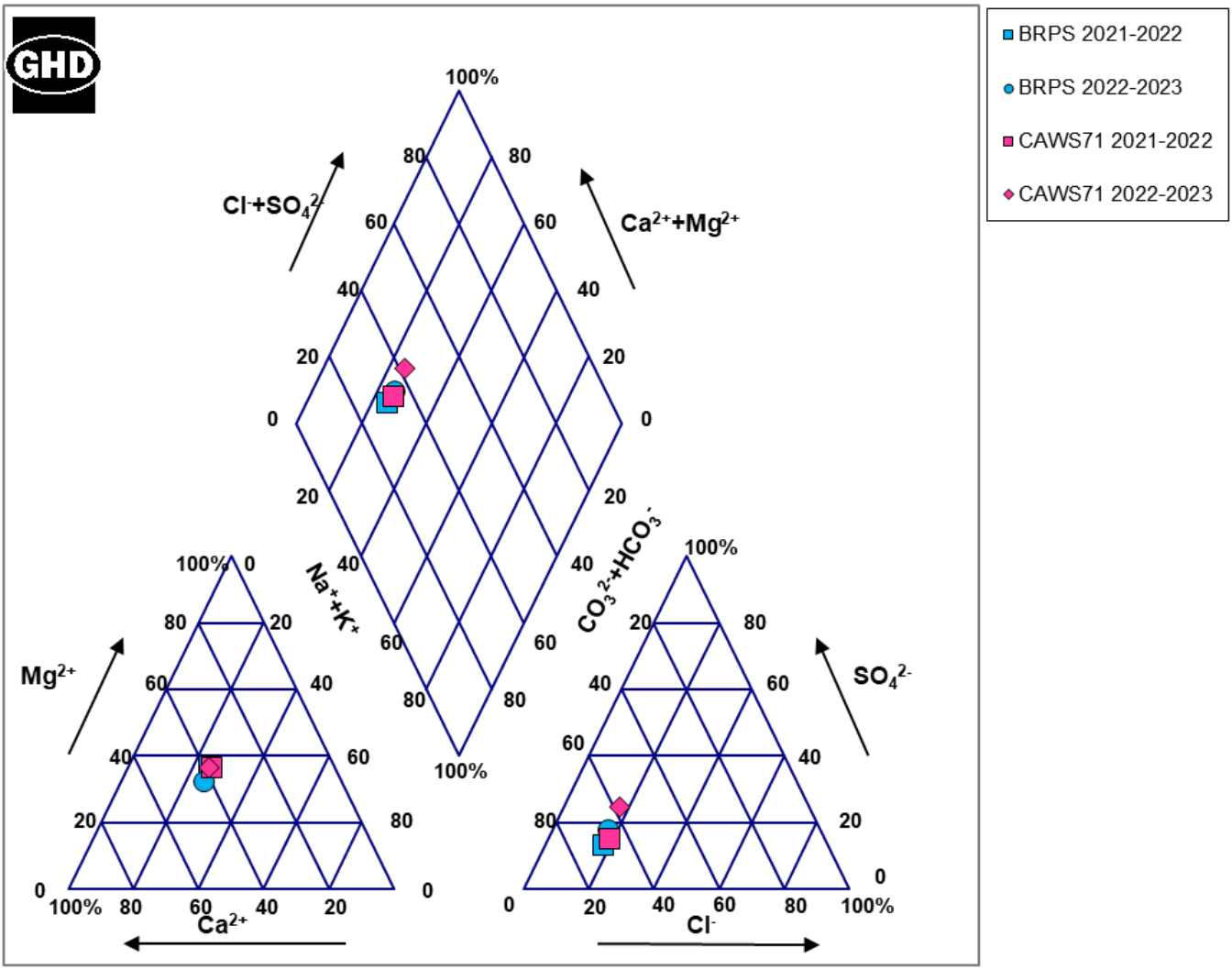


Figure 2.3 Piper chart showing differences in major ion composition at Belubula River sites

2.2.4 Dissolved metals

All dissolved antimony, cadmium, chromium, lead, mercury, molybdenum, selenium and silver concentrations were below the laboratory limit of reporting (LOR) at both sites across the historical monitoring period.

Dissolved aluminium concentrations were frequently elevated (compared to the LOR) at both upstream site BRPS and downstream site CAWS71 between July 2021 and November 2022 (Figure 2.4). There was no clear pattern in results between the sites during this time. A decreasing trend in aluminium concentrations was observed at both sites between August 2022 and December 2022, with all dissolved aluminium concentrations between December 2022 and June 2023 at both sites below the LOR. All results were well below the livestock and irrigation guideline values.

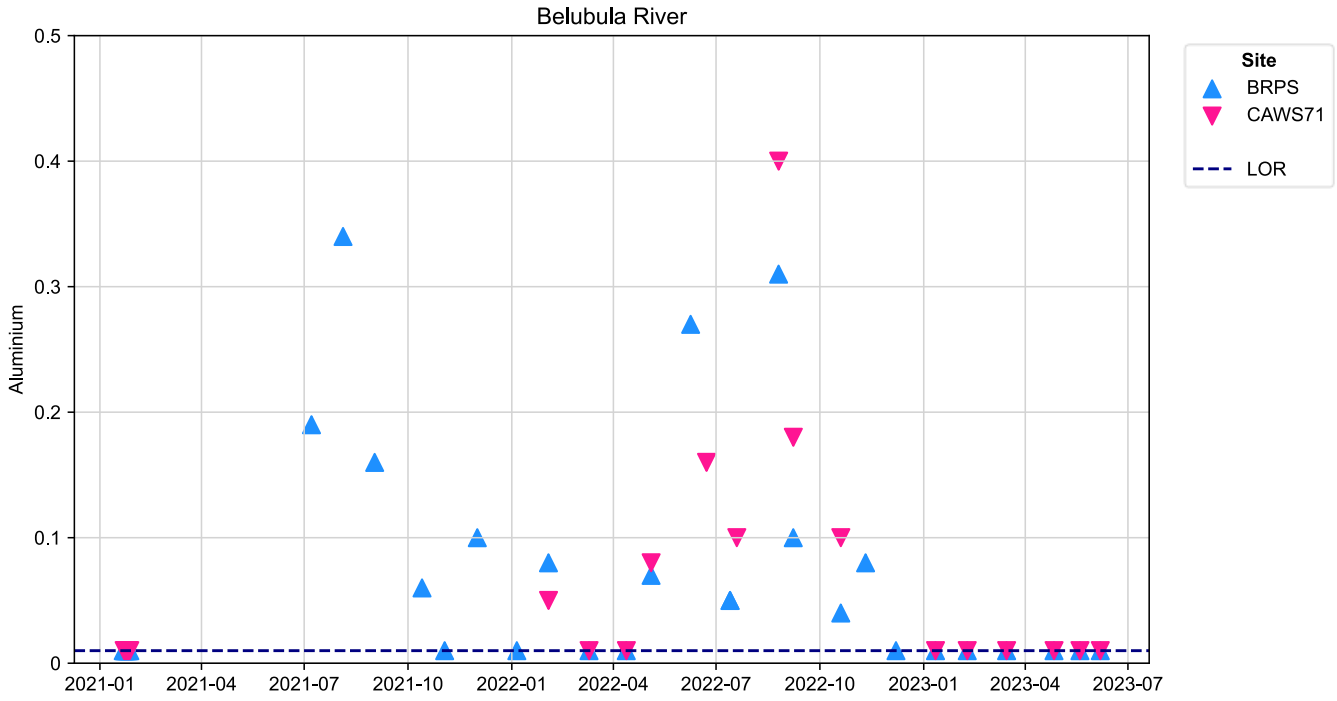


Figure 2.4 Dissolved aluminium concentrations in the Belubula River

Dissolved arsenic concentrations (Figure 2.5) were similar between the sites (within 0.001 mg/L) during all sampling events of the historical monitoring period. Dissolved arsenic concentrations were highest at both sites in February and March 2023, but concentrations declined rapidly between March and June 2023, to be only slightly above the LOR and equal at both sites. All results were well below the livestock and irrigation guideline values.

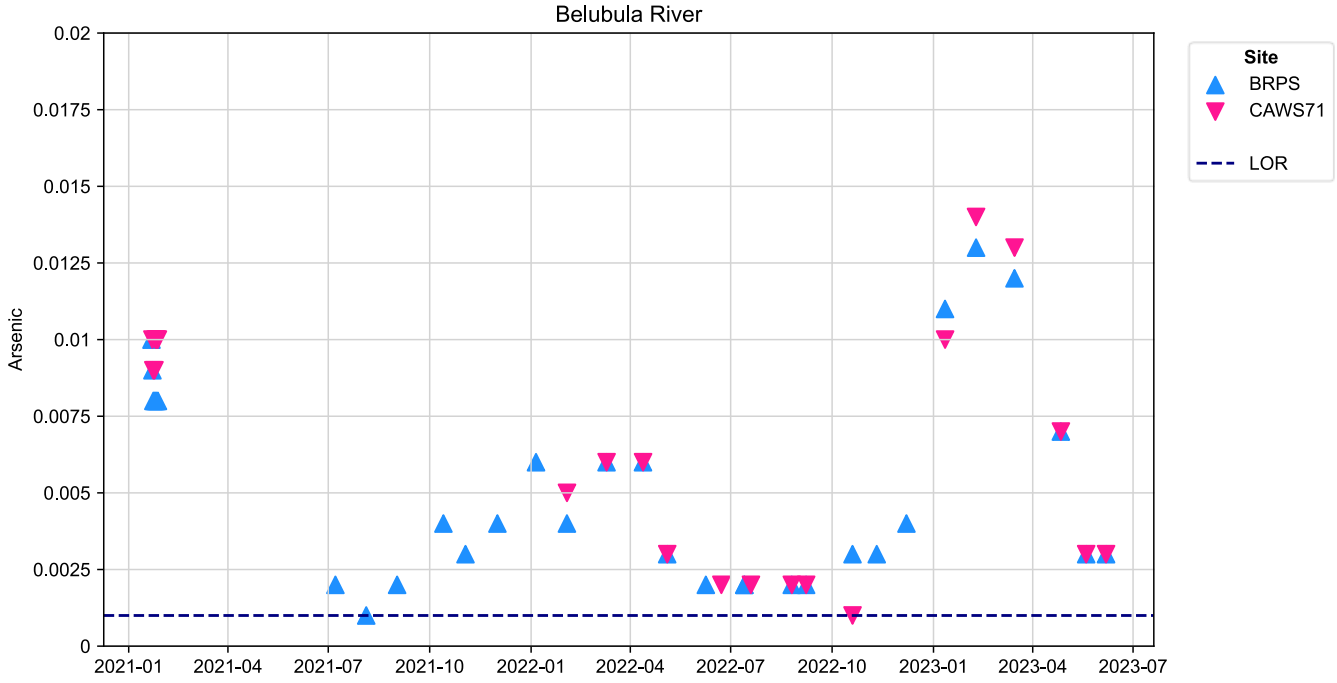


Figure 2.5 Dissolved arsenic concentrations in the Belubula River

Dissolved cobalt concentrations at downstream site CAWS71 were equal to or lower than those at upstream site BRPS during all sampling events of the historical monitoring period. Dissolved cobalt concentrations were generally below the LOR at both sites, although there were some elevated concentrations observed (compared to LOR), particularly in early-2021 and early 2023. All results were well below the livestock and irrigation guideline values.

Dissolved copper concentrations were generally consistent between sites, with the majority of results below the LOR at both sites (Figure 2.6). The highest copper concentration observed during the historical monitoring period was recorded at CAWS71 in October 2022. However, this concentration was an isolated occurrence, and all subsequent copper concentrations had returned to within the typical range of results, with most below the LOR. All results were well below the livestock and irrigation guideline values.

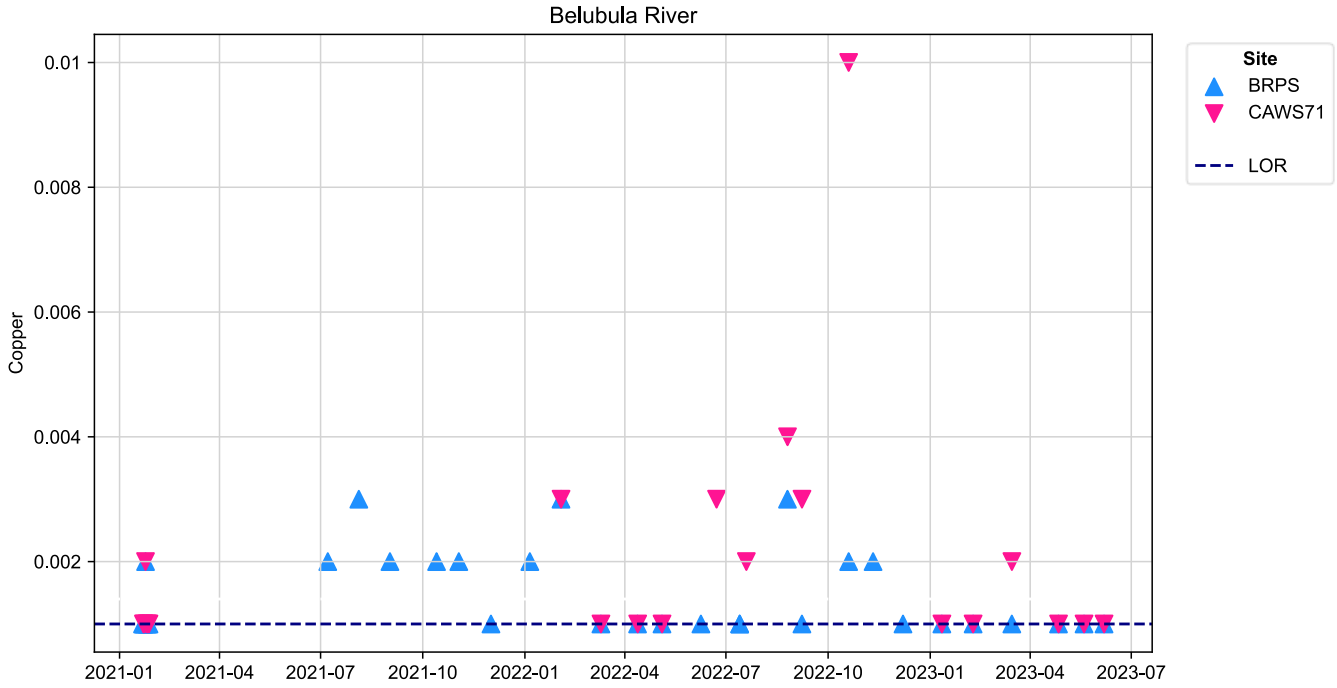


Figure 2.6 Dissolved copper concentrations in the Belubula River

Dissolved iron concentrations were generally elevated (compared to LOR) at both sites during much of the July 2021 to January 2023 period, while dissolved iron concentrations in the January to June 2023 monitoring period were consistently much lower. All exceedances of the long-term irrigation guideline value occurred in 2021 and 2022 and there have been no exceedances in 2023. Dissolved iron concentrations at upstream site BRPS were slightly higher than at the downstream site CAWS71 over the monitoring period and this is reflected in the slightly higher median value as shown in Table 2.1.

All dissolved manganese concentrations were very low, with all except one result (upstream site BRPS in February 2022) below 0.06 mg/L. All results were below the irrigation guideline value. Manganese concentrations were similar between the two sites during all other sampling events.

Concentrations of dissolved nickel were low (below the LOR) during most sampling events. The highest dissolved nickel concentration was observed at CAWS71 in August 2022; however, this concentration did not persist, with all subsequent nickel concentrations at CAWS71 returning to below the LOR. All results were well below the livestock and irrigation guideline values.

Concentrations of dissolved zinc were below the LOR during most sampling events. Like the nickel concentration, the dissolved zinc concentration at CAWS71 was also elevated above the usual range of results in August 2022. The zinc concentration observed at upstream site BRPS in August 2022 was also elevated, though the concentration was lower than that observed at CAWS71. Zinc concentrations were also elevated at upstream site BRPS only on several occasions in late-2021. These elevated zinc concentrations did not persist, with all subsequent zinc concentrations below the LOR. All results were well below the livestock and irrigation guideline values.

2.2.5 Summary

Results were generally consistent between the Belubula River sites upstream (BRPS) and downstream (CAWS71) of the Cadiangullong Creek confluence. Exceptions to this include slightly higher EC, and most major ions (mostly notably sulfate) at CAWS71, during most sampling events but particularly in the January to June 2023 period. In addition, TP concentrations were generally higher at upstream site BRPS.

There were minimal exceedances of the ANZECC (2000) irrigation and stock watering guidelines. The exceedances recorded were generally consistent between upstream and downstream sites and unlikely to be attributable to Cadiangullong Creek.

There were isolated incidences of elevated dissolved copper, nickel and zinc at CAWS71 that were not observed at BRPS, most of which occurred during the 2022-2023 reporting period. However, these detections were inconsistent and did not display clear trends, with subsequent concentrations following these peaks quickly returning to within the historical range.

Several dissolved metals have remained below the LOR in all samples of the historical monitoring period, including antimony, cadmium, chromium, lead, mercury, molybdenum, selenium and silver.

3. References

ANZECC and ARMCANZ (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Volume 1: The Guidelines*, Australia and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

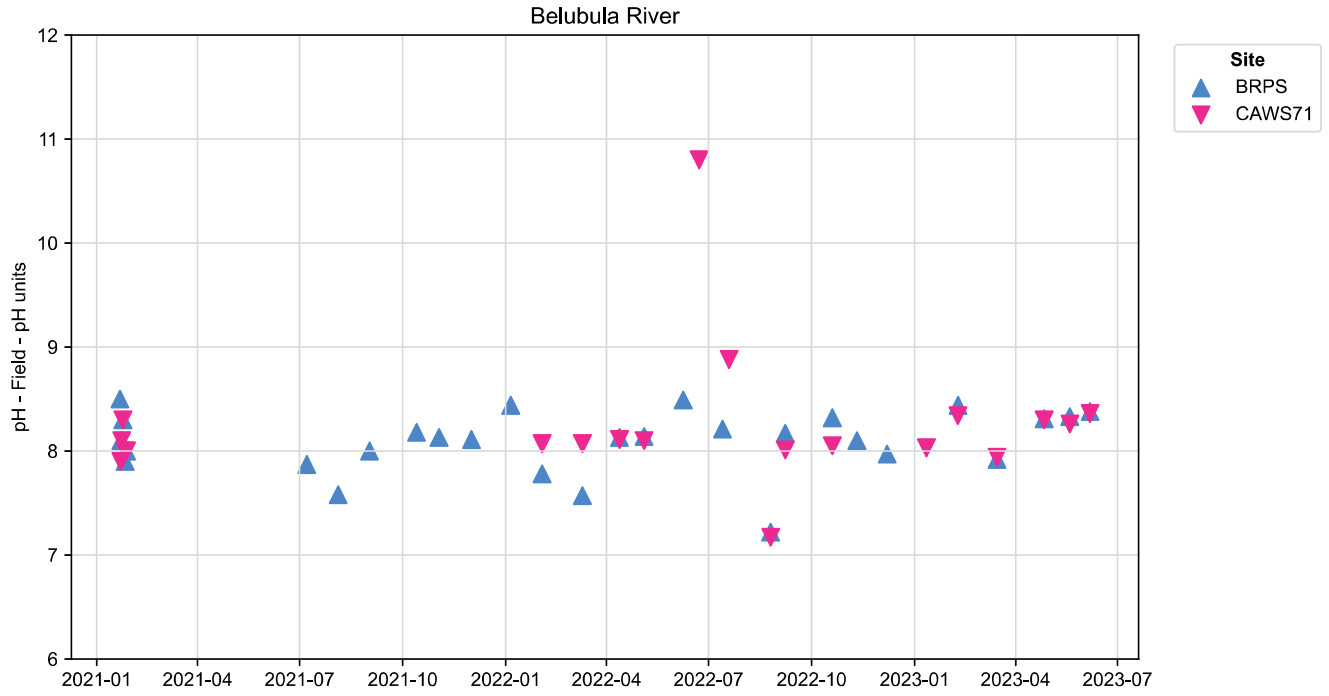
ANZG (2018) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia.

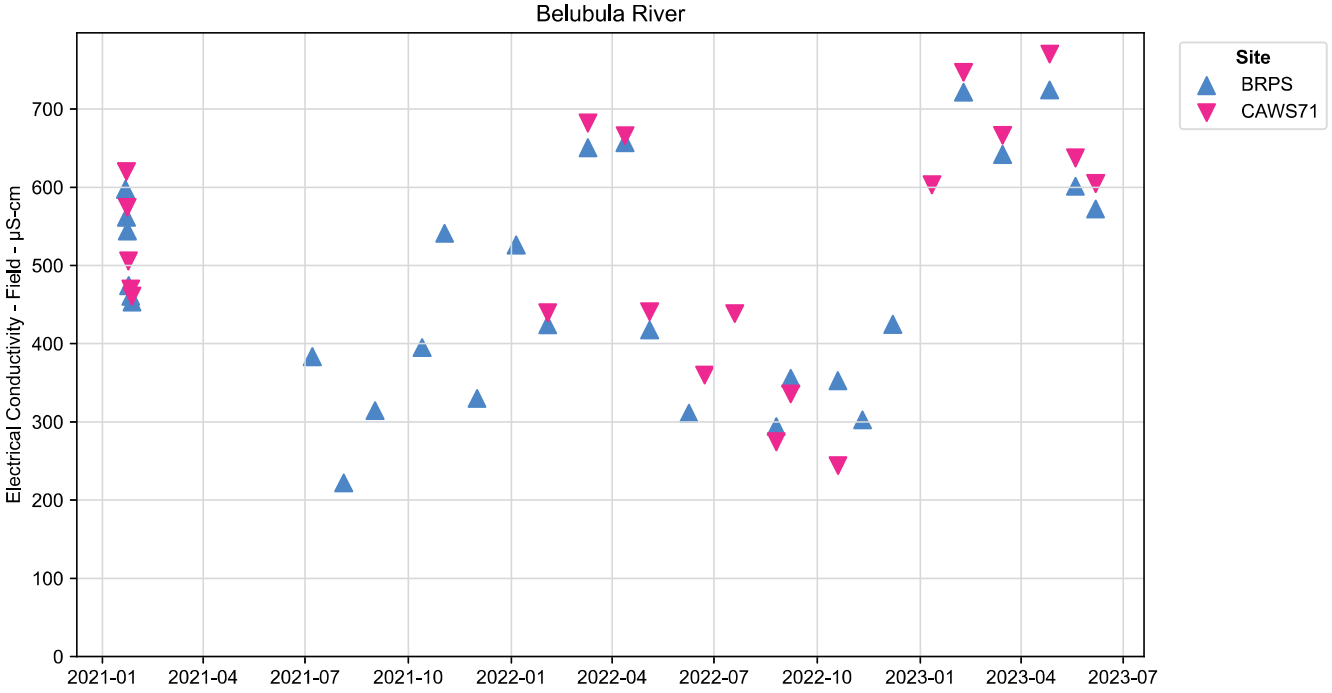
GHD (2023) *Cadia Annual Review 2022-2023: Surface Water Assessment (September* 2023).

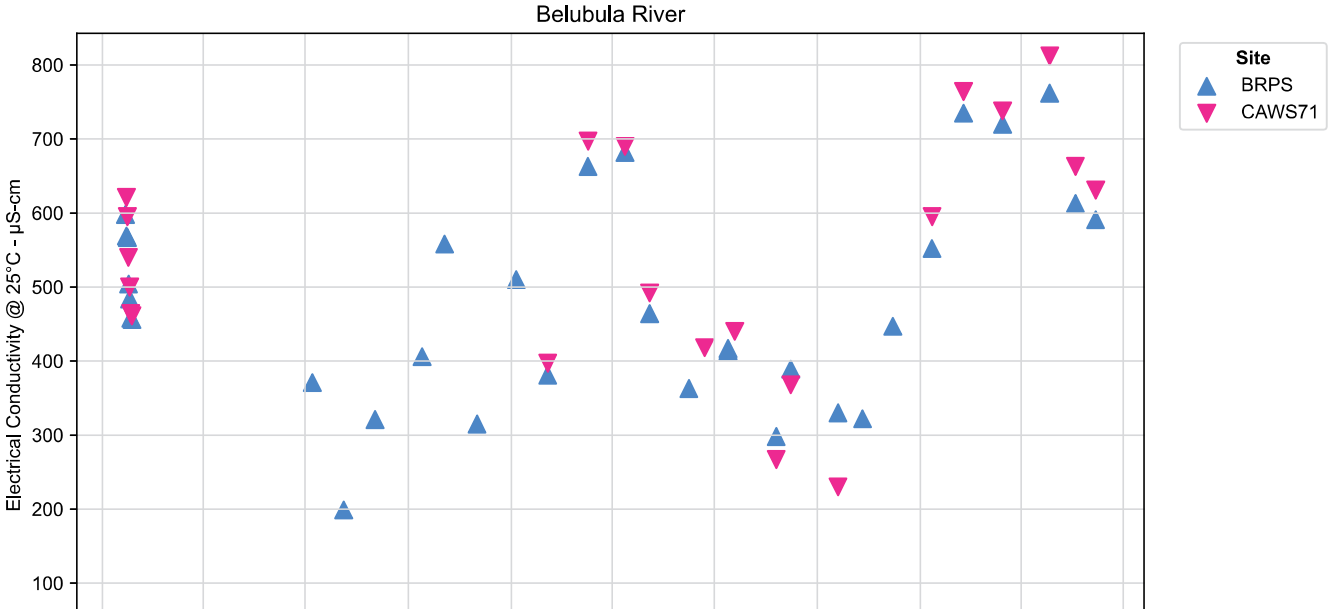
Appendices

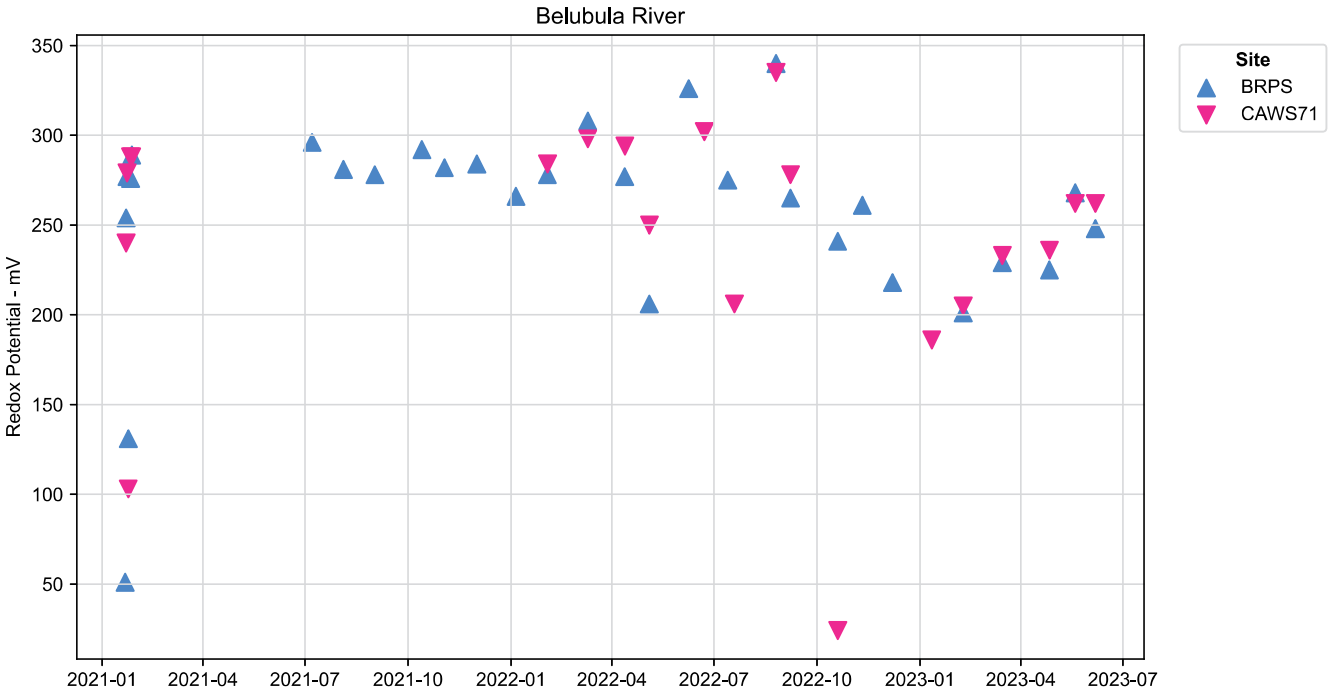
Appendix A

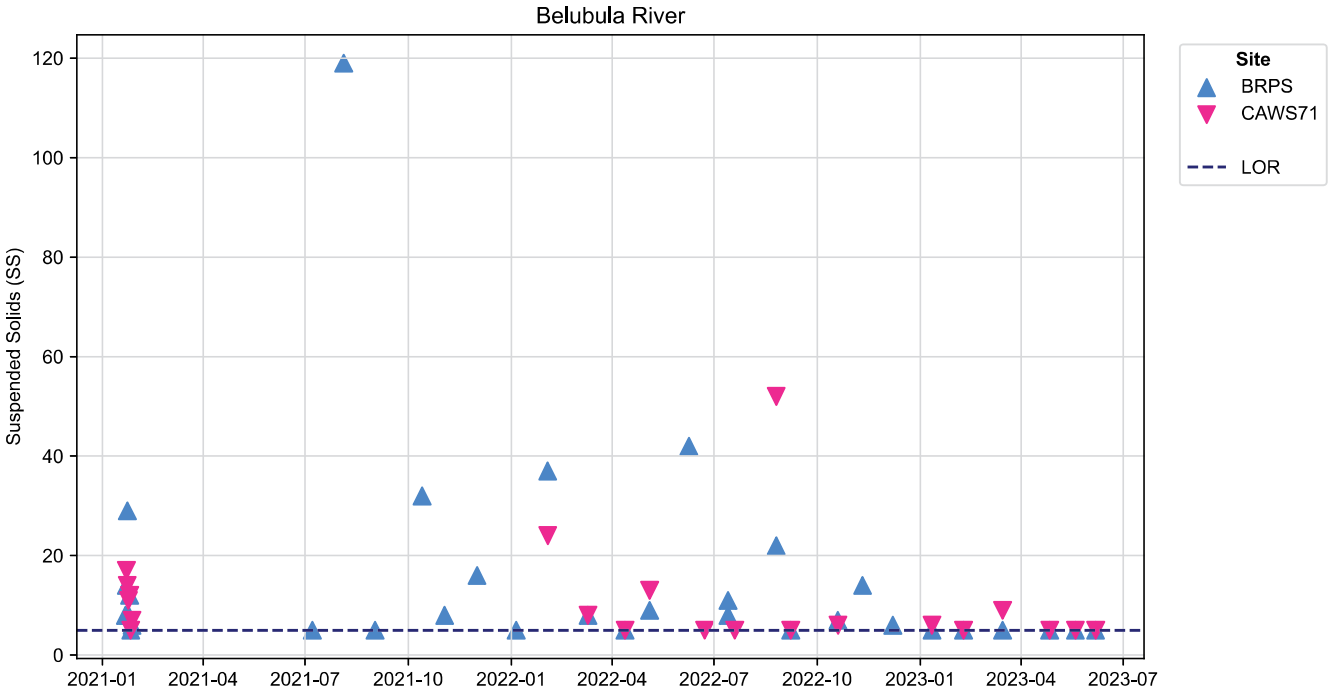
Surface water quality graphs

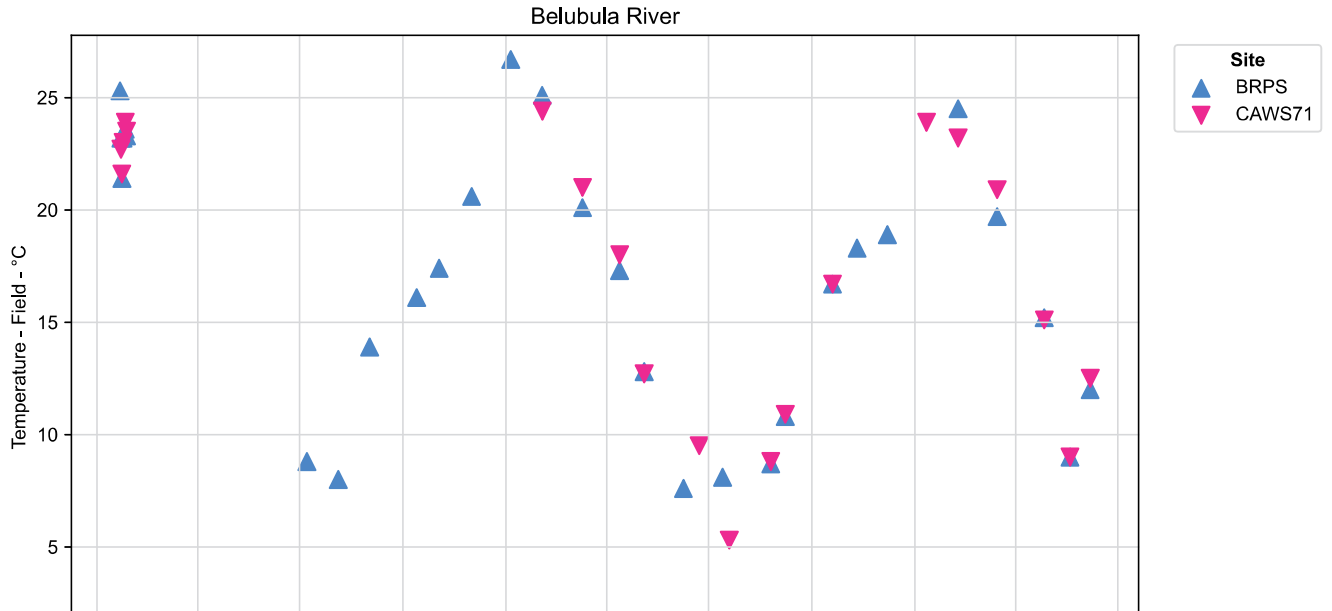

Belubula River
pH - Field - pH units
12
11
10
9
8
7
6
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71

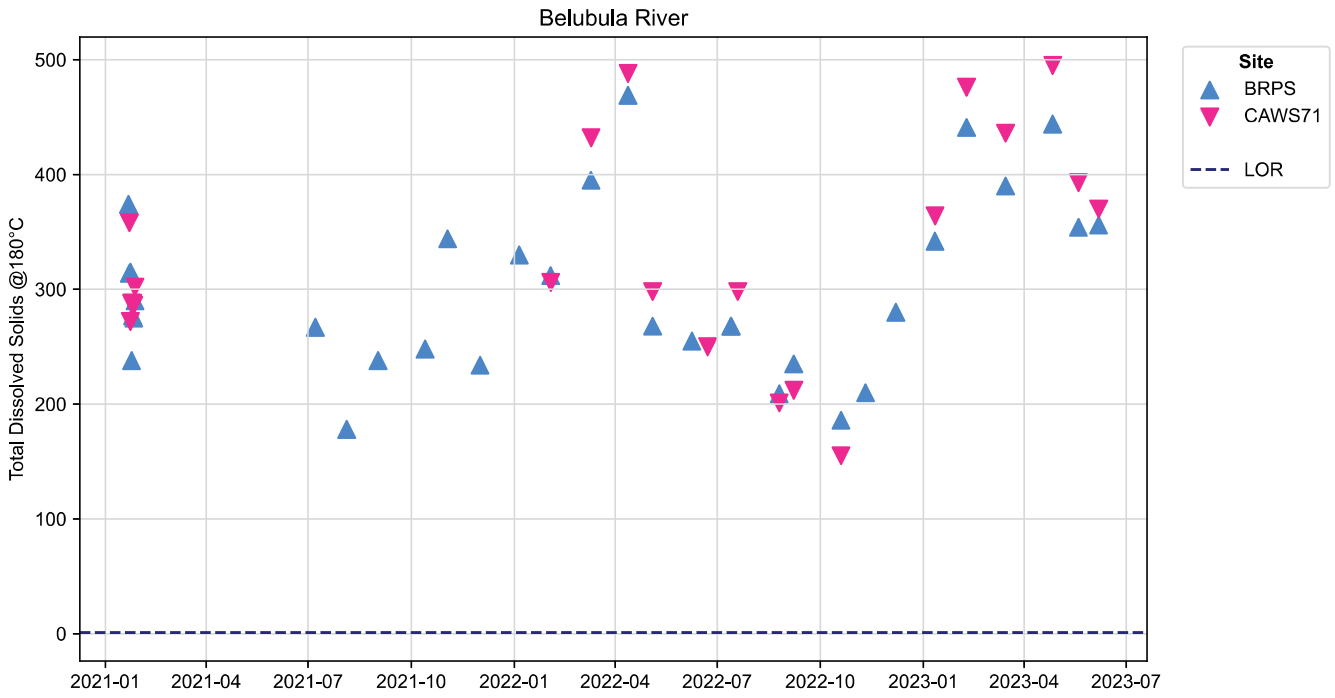

Belubula River
Electrical Conductivity - Field - µS-cm
700
600
500
400
300
200
100
0
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71

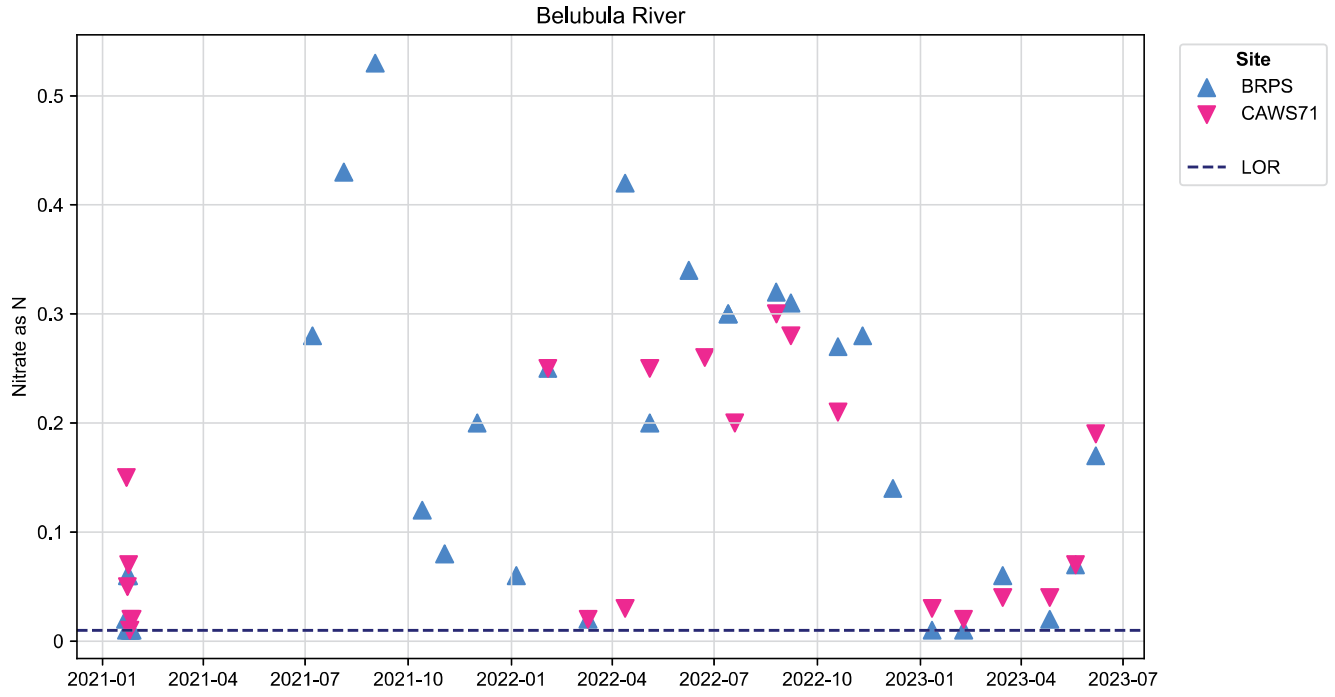

Belubula River
Electrical Conductivity @ 25°C - µS-cm
800
700
600
500
400
300
200
100
Site
BRPS
CAWS71


Belubula River
Redox Potential - mV
350
300
250
200
150
100
50
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71


Belubula River
Suspended Solids (SS)
120
100
80
60
40
20
0
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR


Belubula River
Temperature - Field - °C
25
20
15
10
5
Site
BRPS
CAWS71


Belubula River
Total Dissolved Solids @180°C
500
400
300
200
100
0
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR


Belubula River
Nitrate as N
0.5
0.4
0.3
0.2
0.1
0
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
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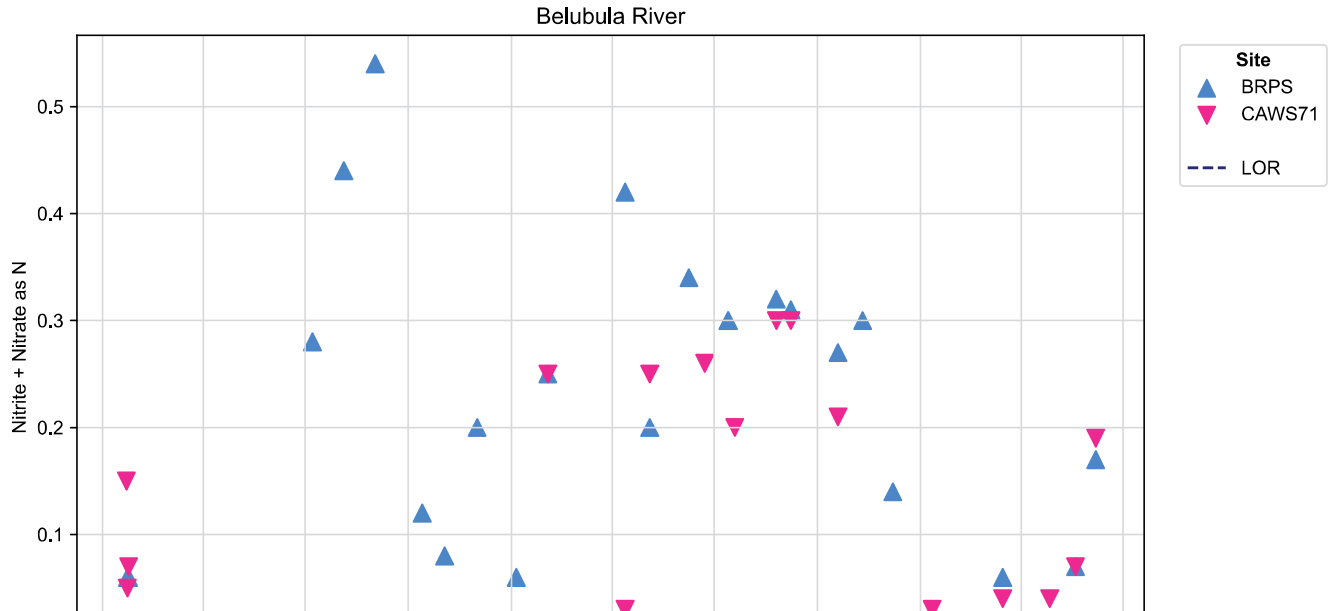
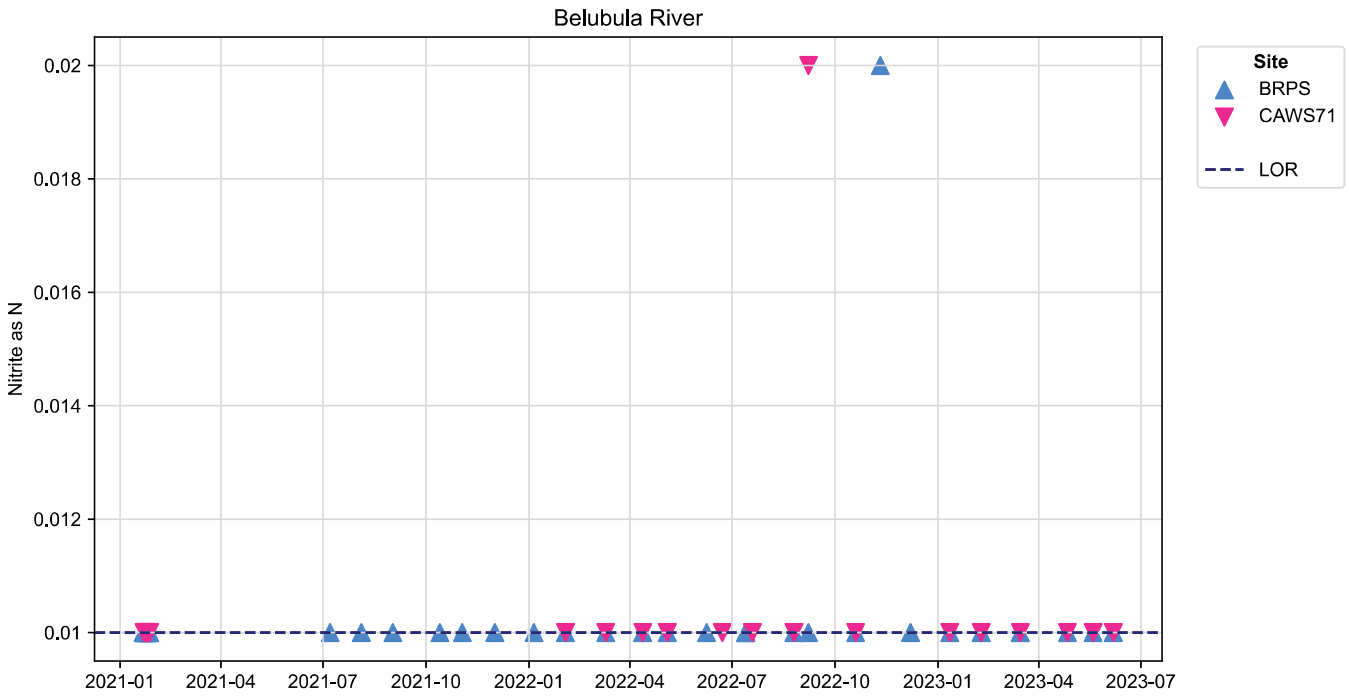
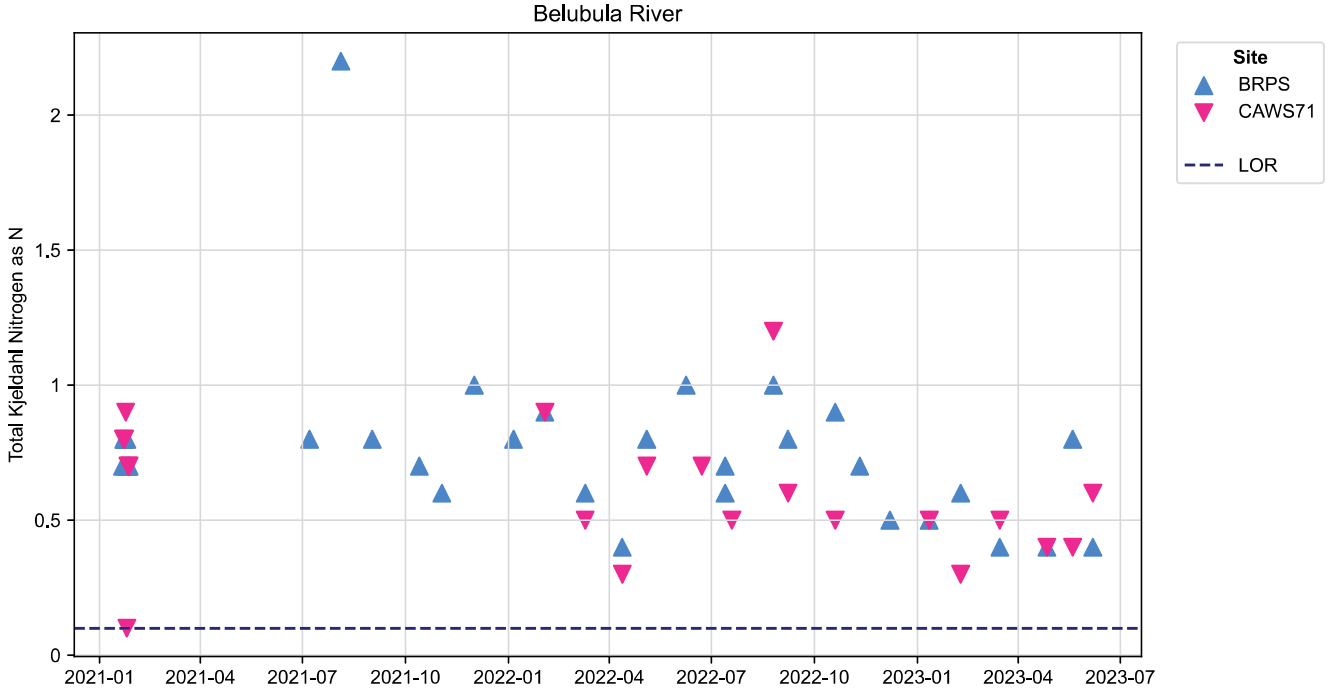
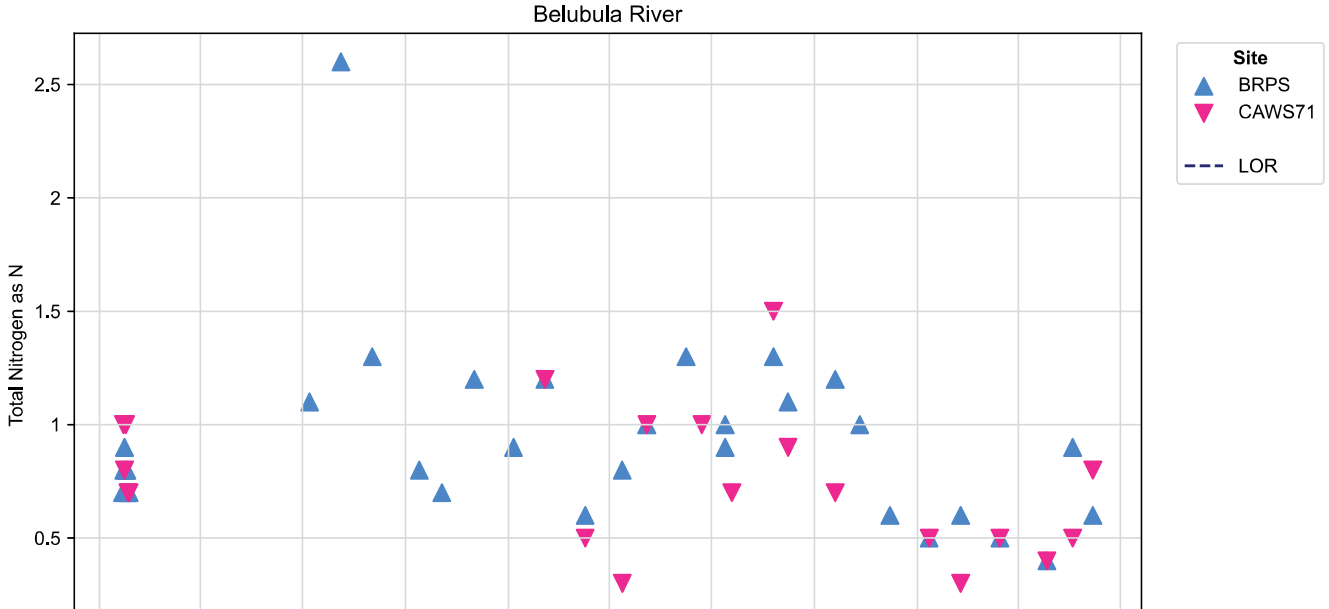
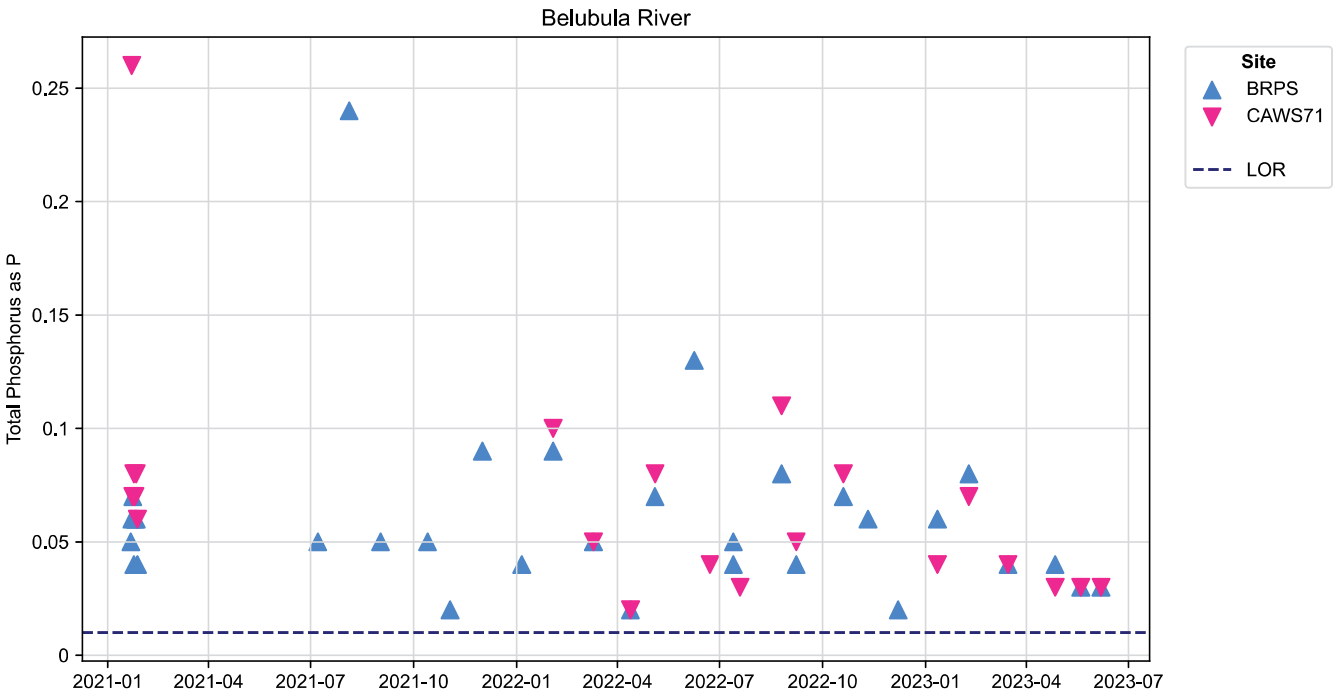
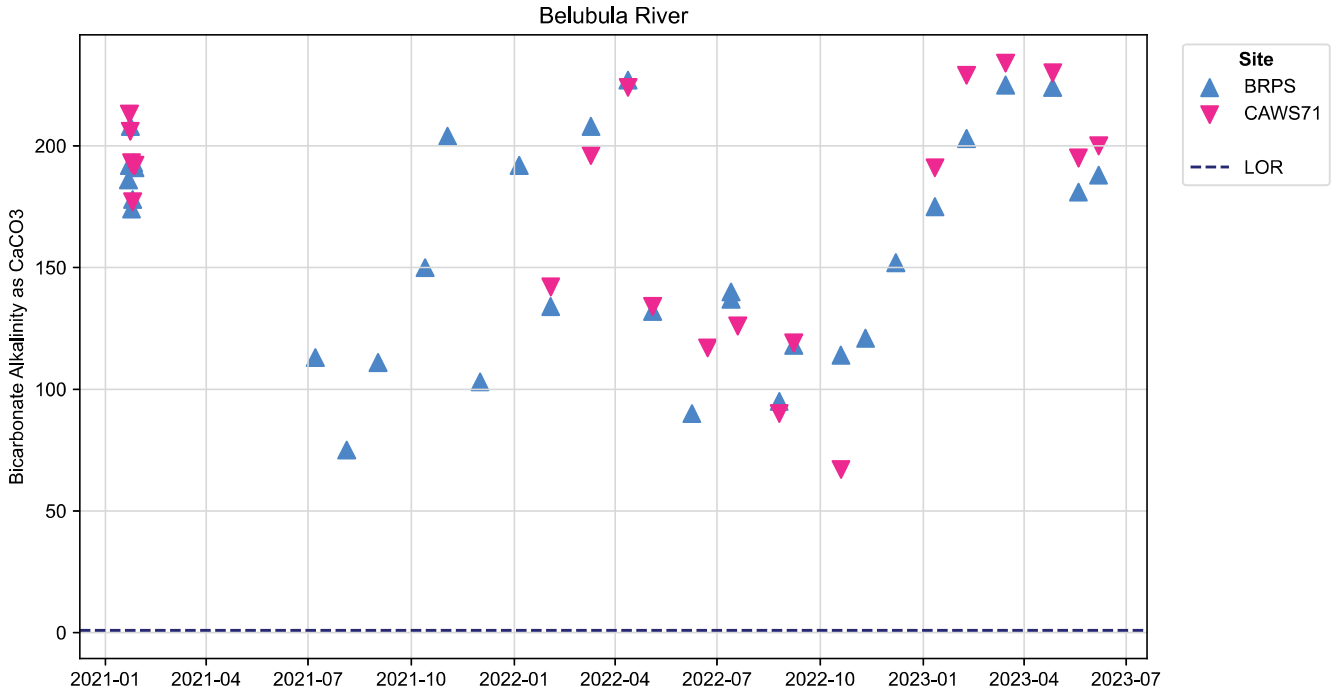

Belubula River
Nitrite + Nitrate as N
0.5
0.4
0.3
0.2
0.1
Site
BRPS
CAWS71
LOR

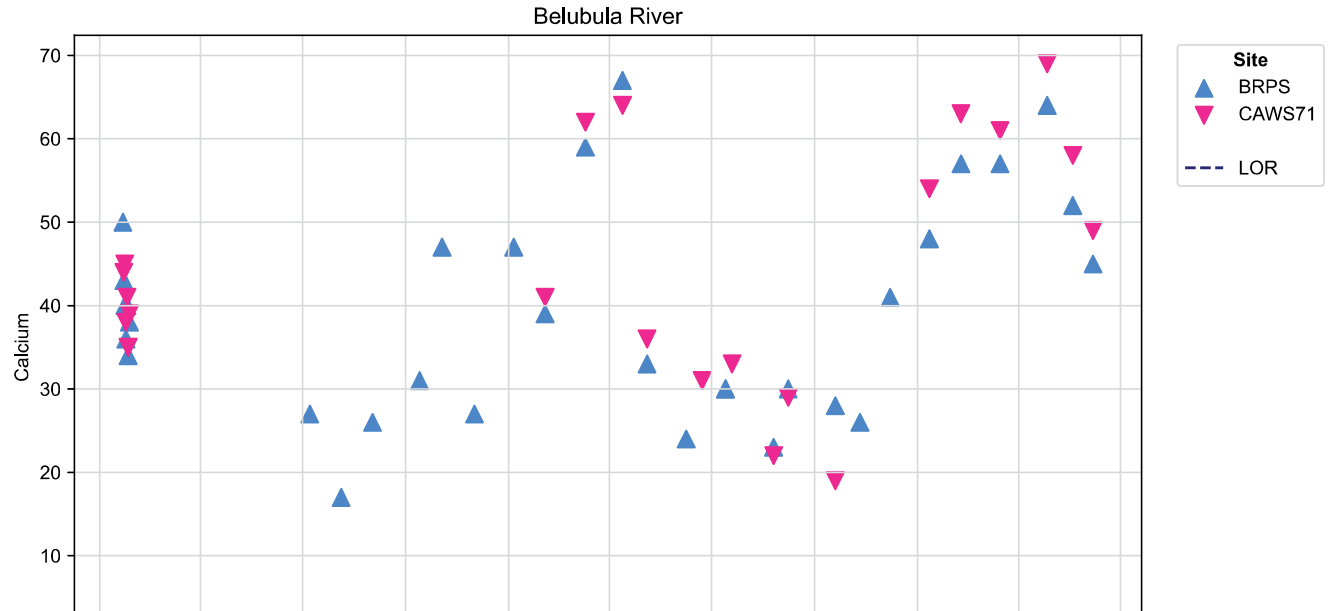

Belubula River
Nitrite as N
0.02
0.018
0.016
0.014
0.012
0.01
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR

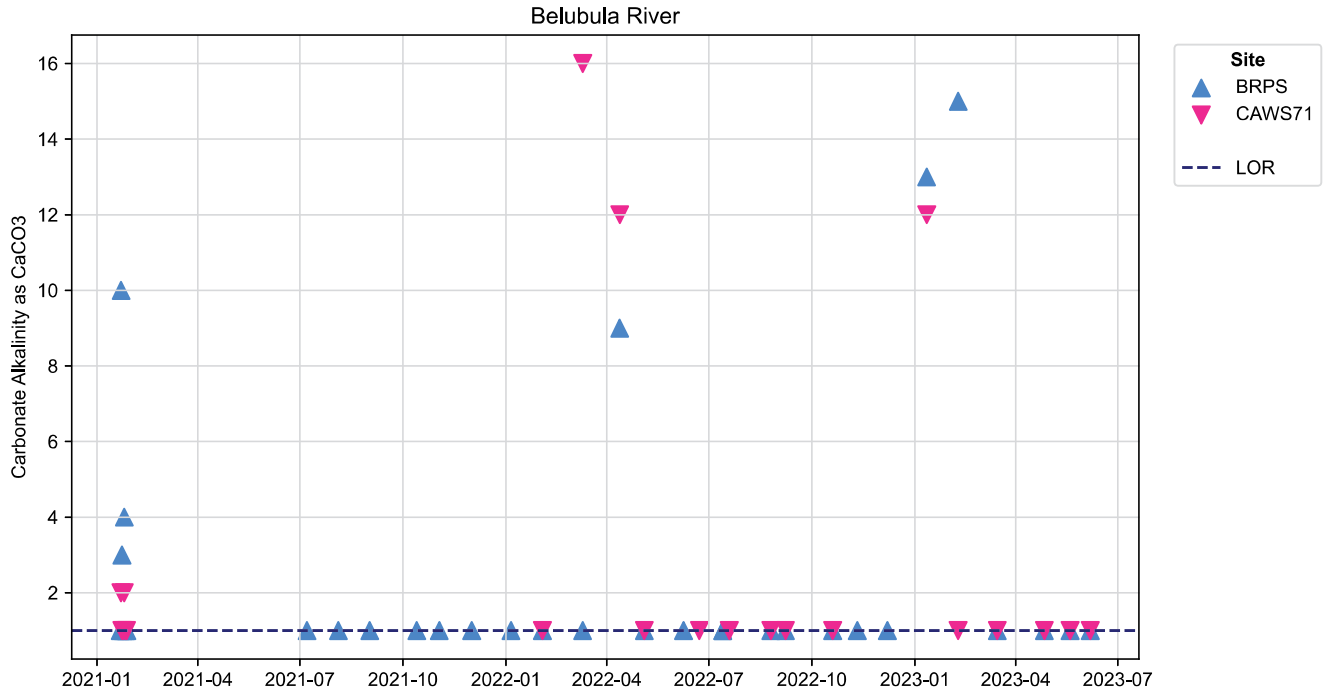

Belubula River
Total Kjeldahl Nitrogen as N
2
1.5
1
0.5
0
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR

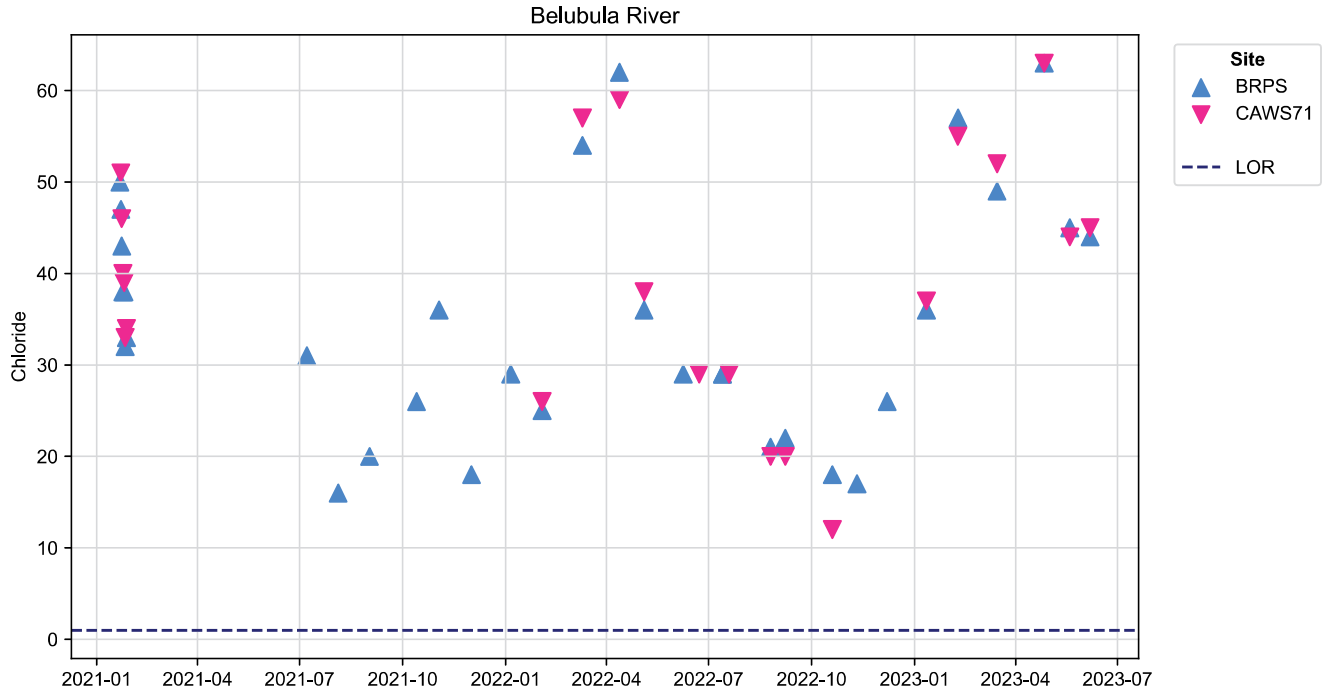

Belubula River
Total Nitrogen as N
2.5
2
1.5
1
0.5
Site
BRPS
CAWS71
LOR

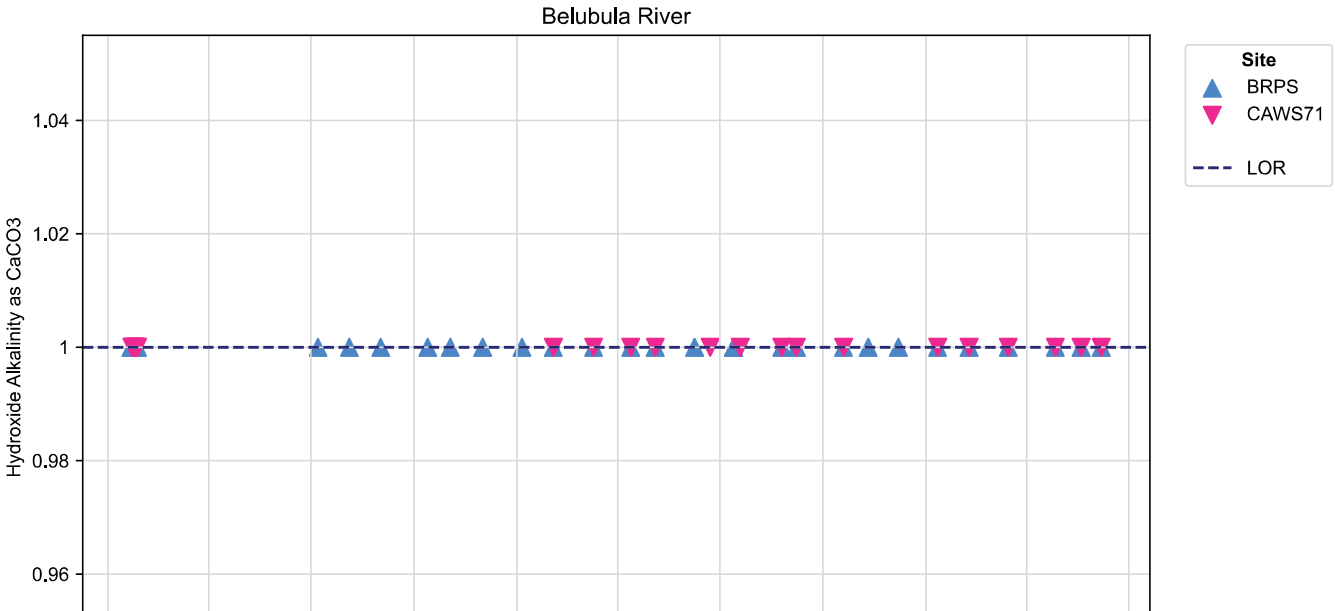

Belubula River
Total Phosphorus as P
0.25
0.2
0.15
0.1
0.05
0
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR

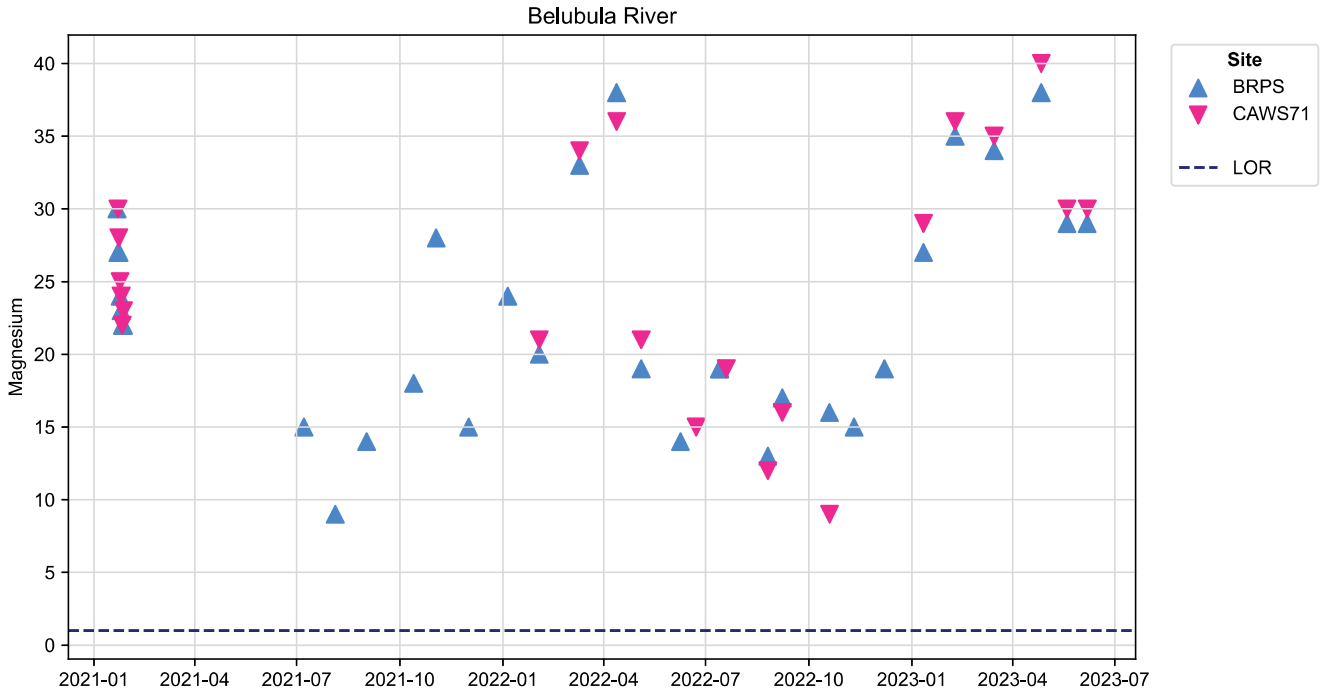

Belubula River
Bicarbonate Alkalinity as CaCO3
200
150
100
50
0
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR

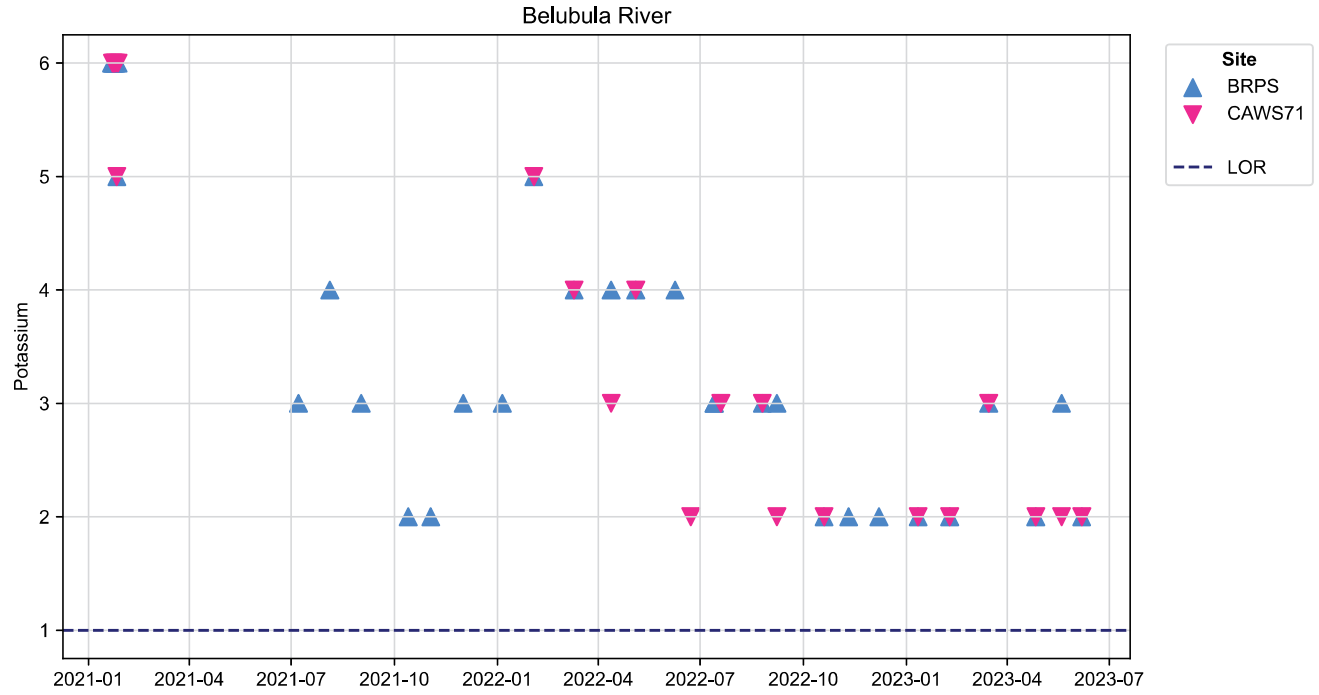

Belubula River
Calcium
70
60
50
40
30
20
10
Site
BRPS
CAWS71
LOR

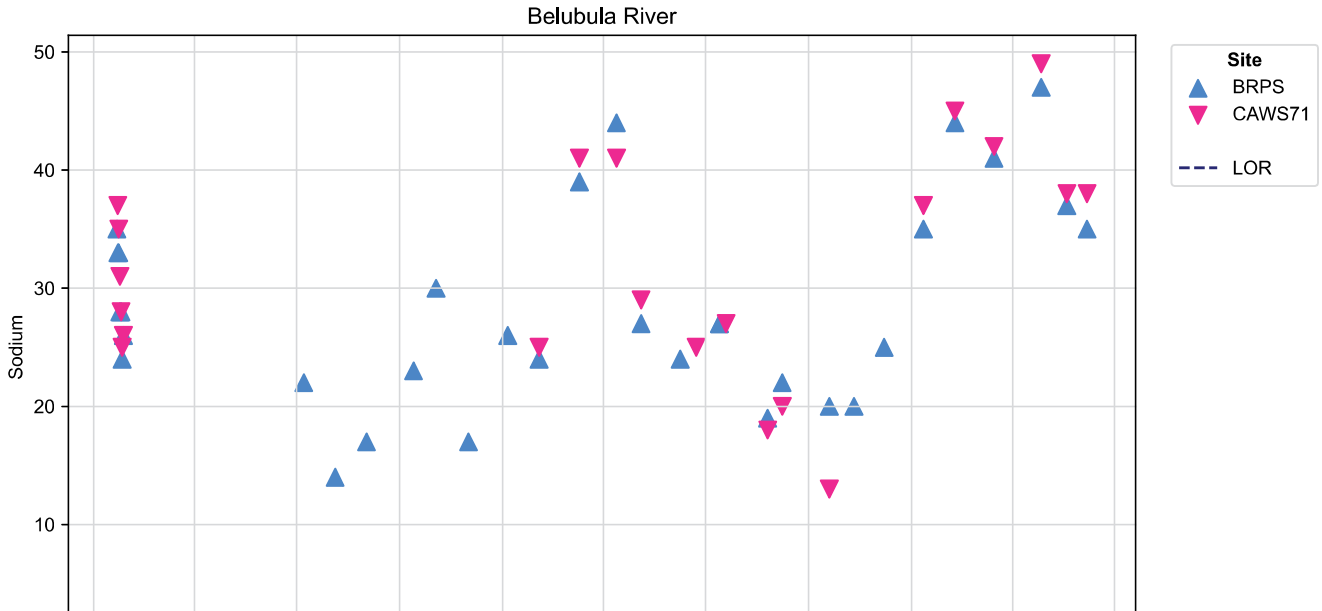

Belubula River
Carbonate Alkalinity as CaCO3
16
14
12
10
8
6
4
2
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR

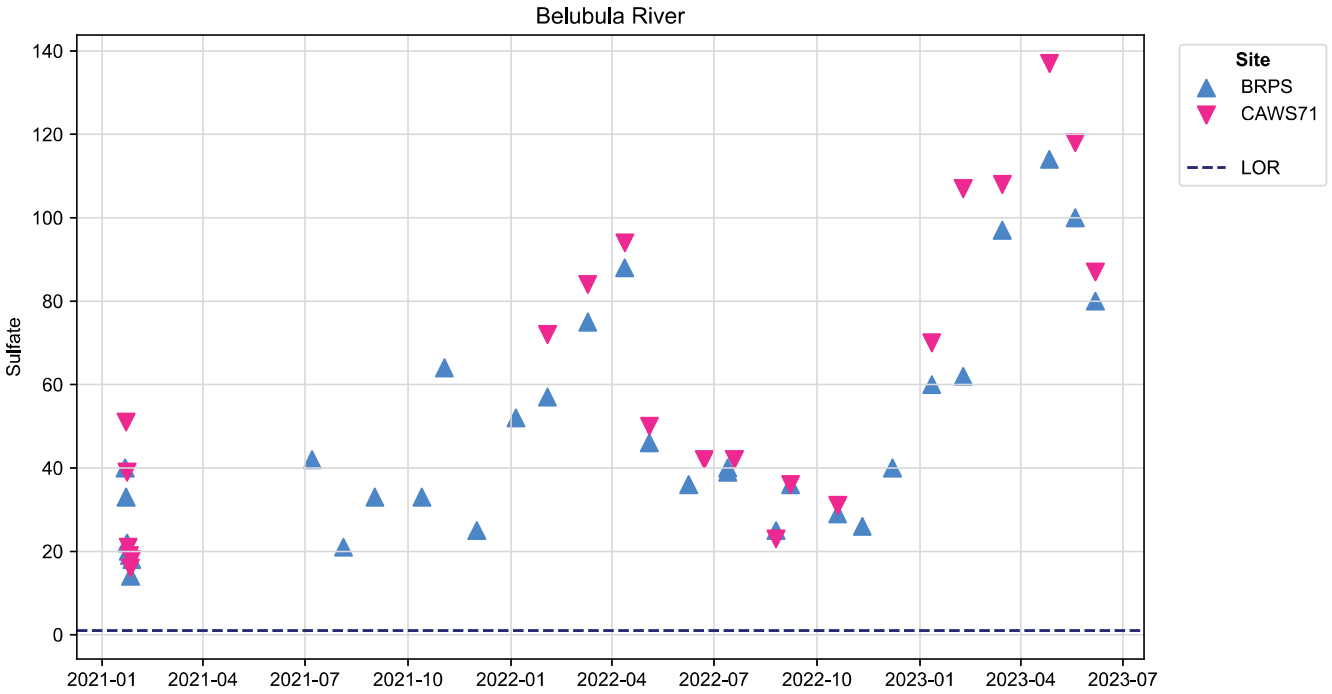

Belubula River
Chloride
60
50
40
30
20
10
0
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR

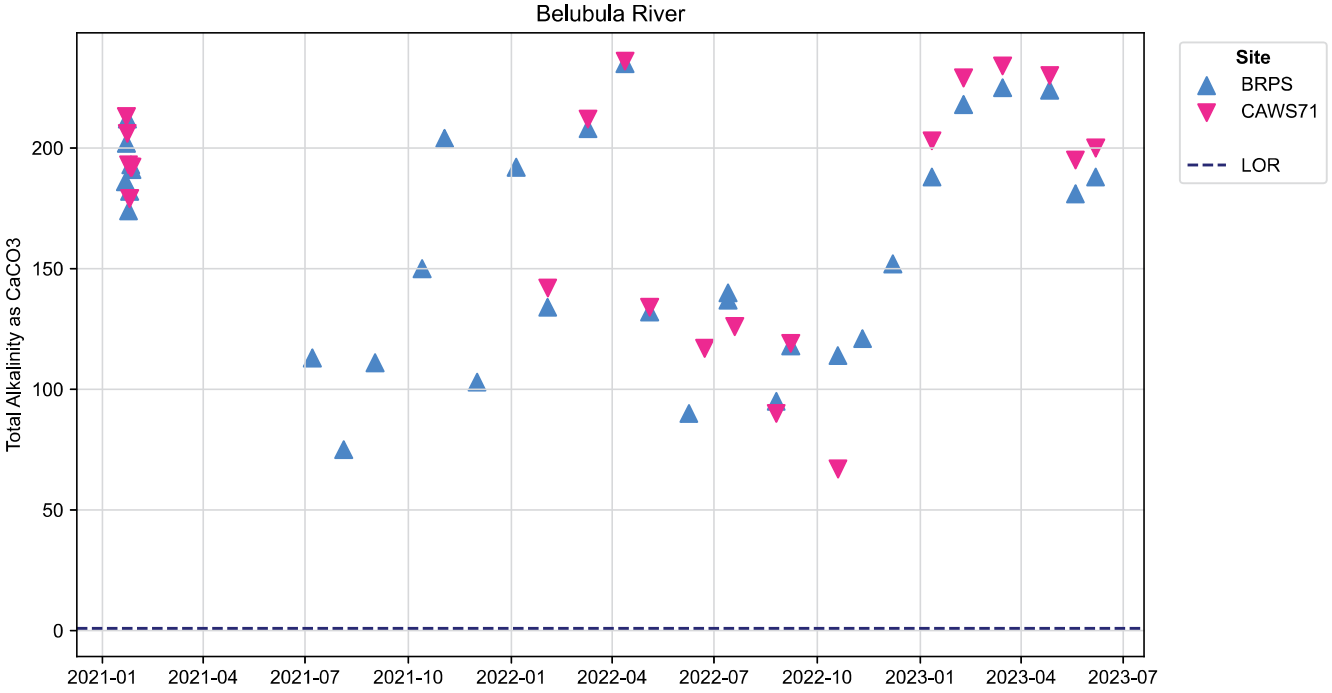

Belubula River
Hydroxide Alkalinity as CaCO3
1.04
1.02
1
0.98
0.96
Site
BRPS
CAWS71
LOR

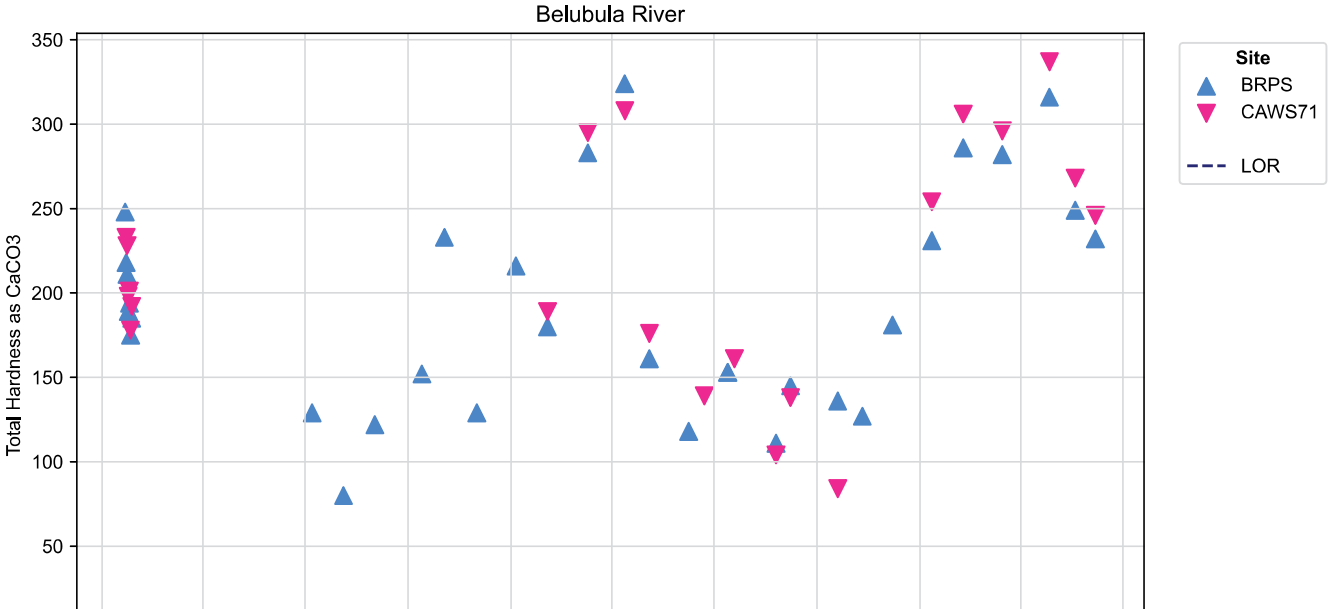

Belubula River
Magnesium
0
5
10
15
20
25
30
35
40
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR

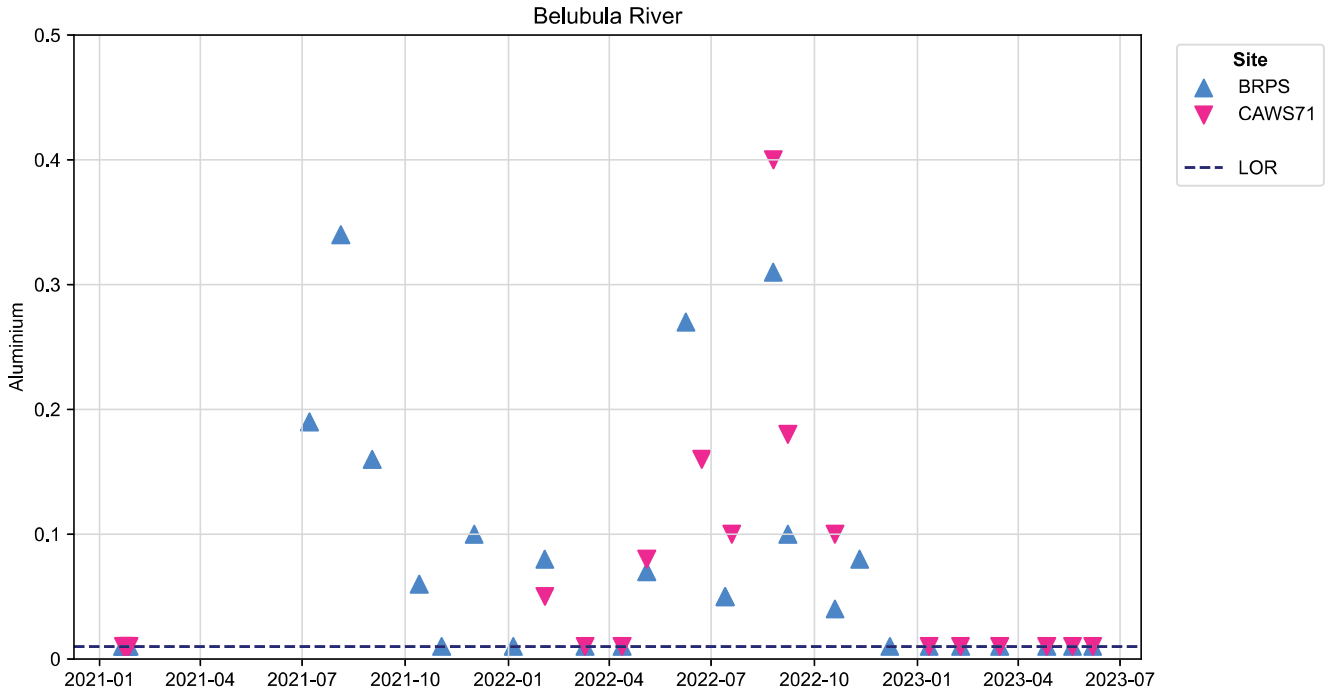

Belubula River
Potassium
1
2
3
4
5
6
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR

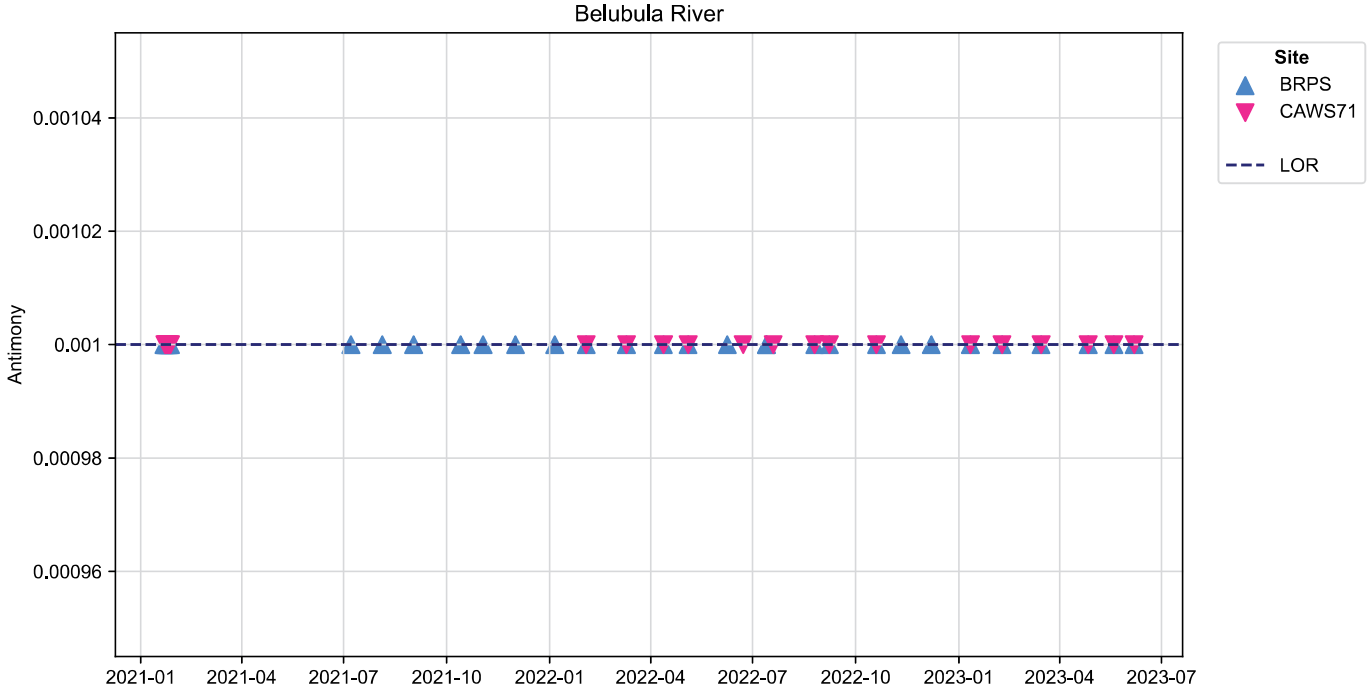

Belubula River
Sodium
10
20
30
40
50
Site
BRPS
CAWS71
LOR

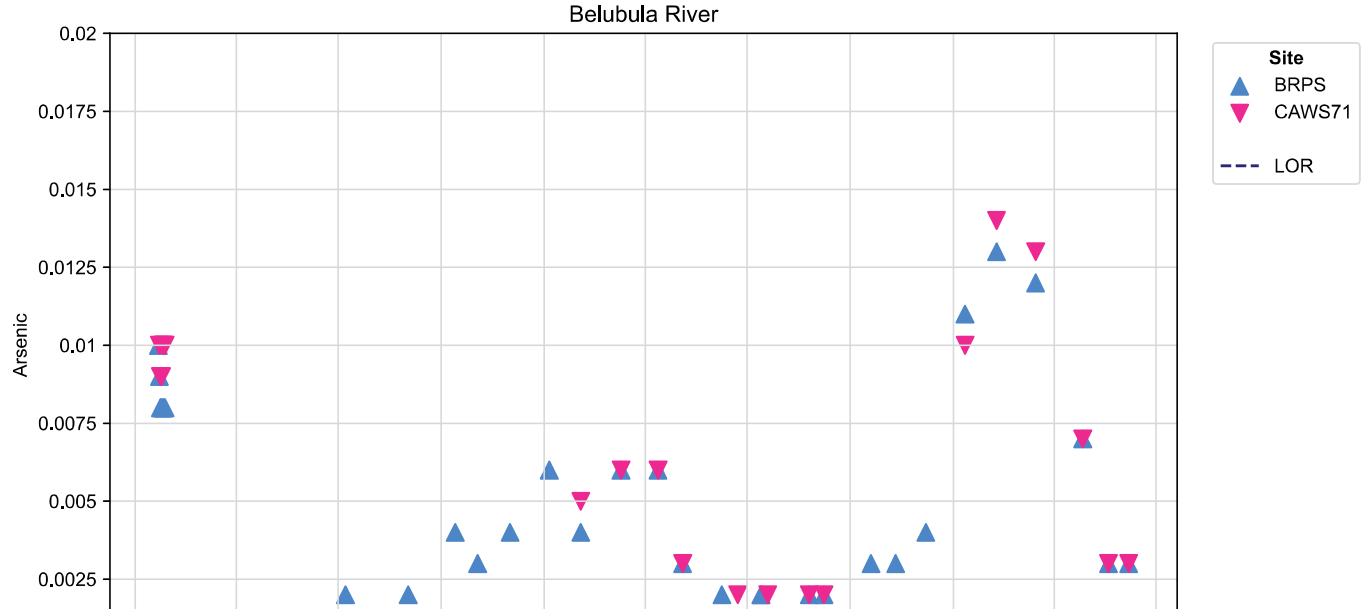

Belubula River
Sulfate
Site
BRPS
CAWS71
LOR
0
20
40
60
80
100
120
140
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07

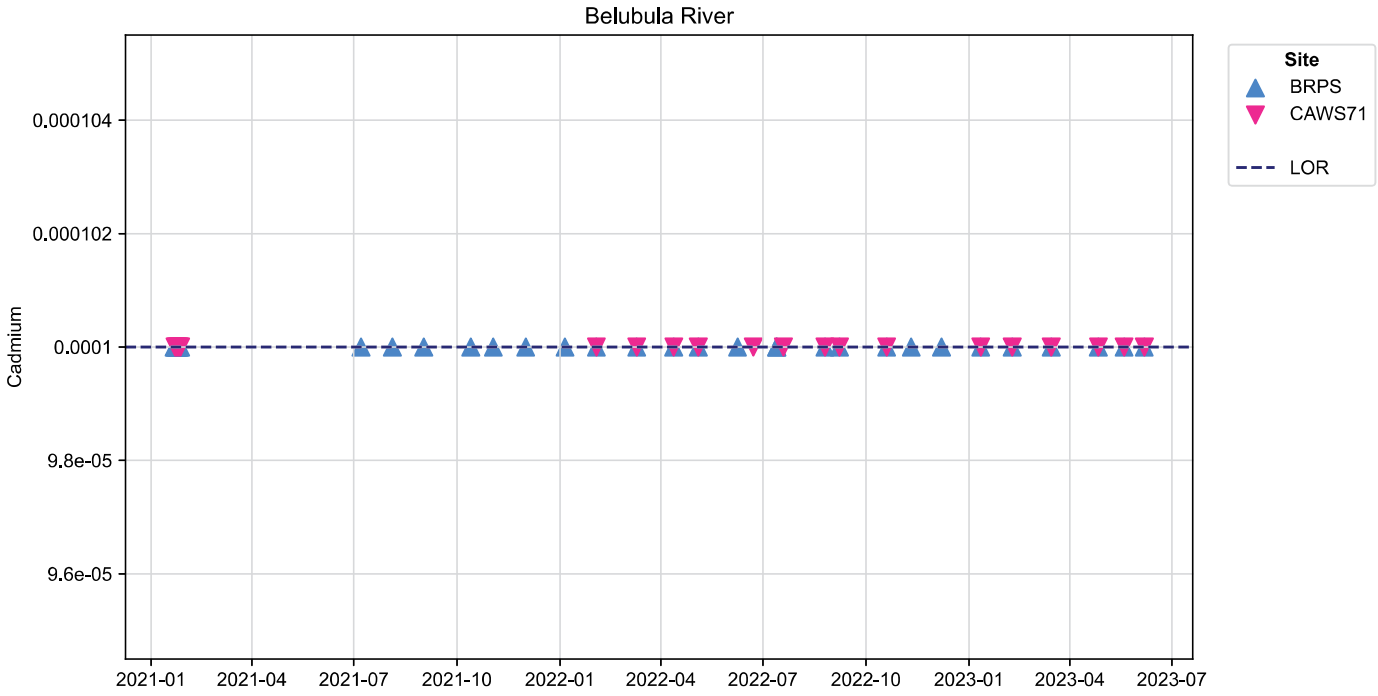

Belubula River
Total Alkalinity as CaCO3
Site
BRPS
CAWS71
LOR
0
50
100
150
200
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07

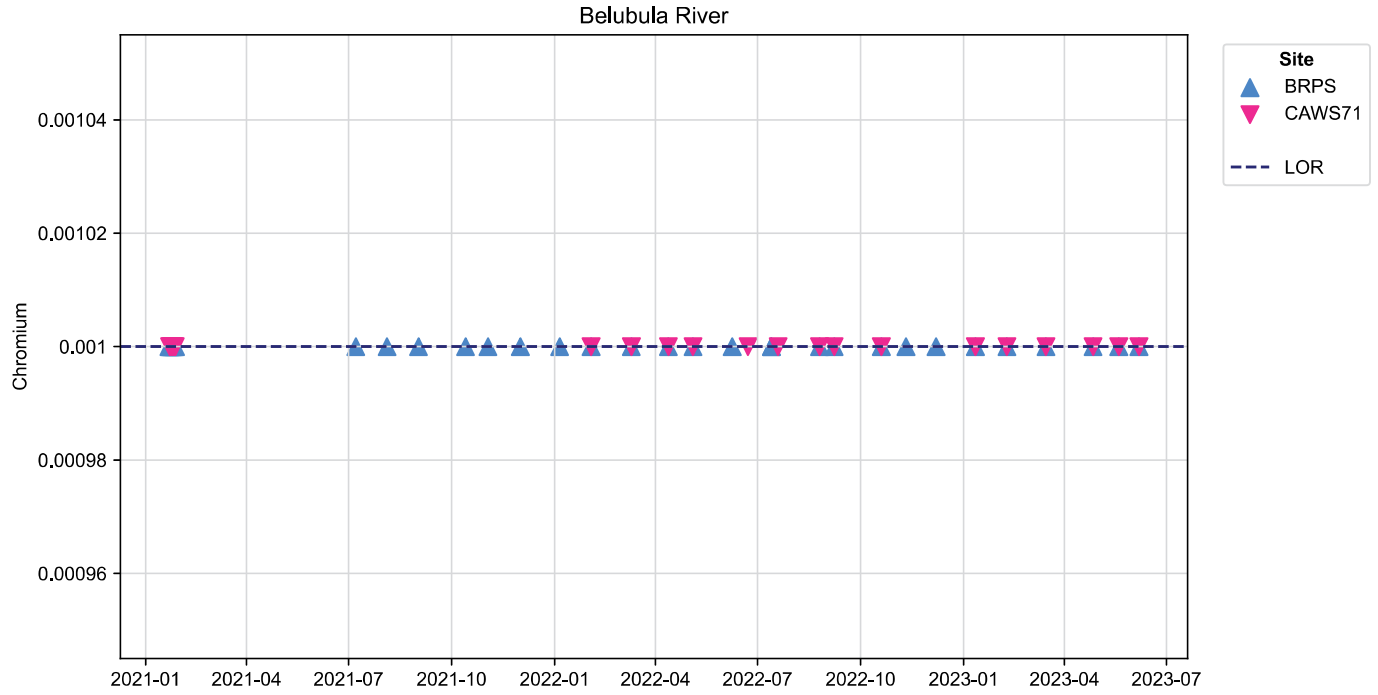

Belubula River
Total Hardness as CaCO3
Site
BRPS
CAWS71
LOR
50
100
150
200
250
300
350


Belubula River
Aluminium
0.5
0.4
0.3
0.2
0.1
0
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR


Belubula River
Antimony
0.00104
0.00102
0.001
0.00098
0.00096
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR


Belubula River
Arsenic
0.02
0.0175
0.015
0.0125
0.01
0.0075
0.005
0.0025
Site
BRPS
CAWS71
LOR


Belubula River
Cadmium
0.000104
0.000102
0.0001
9.8e-05
9.6e-05
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR


Belubula River
Chromium
0.00104
0.00102
0.001
0.00098
0.00096
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
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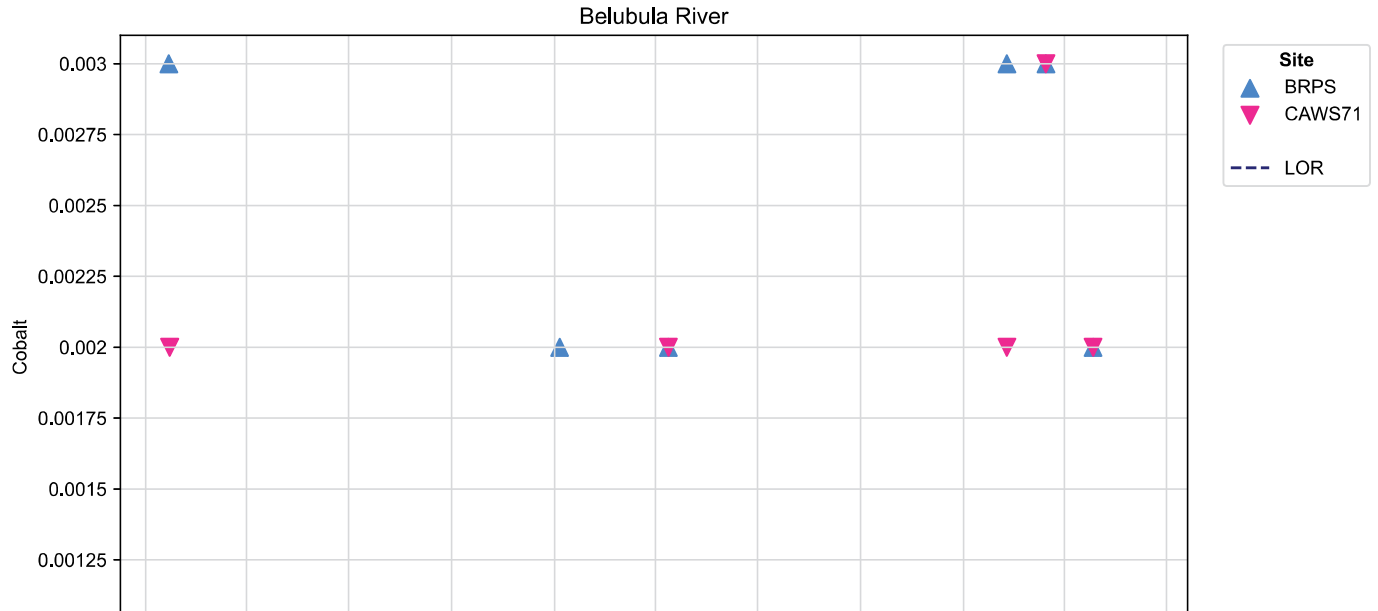
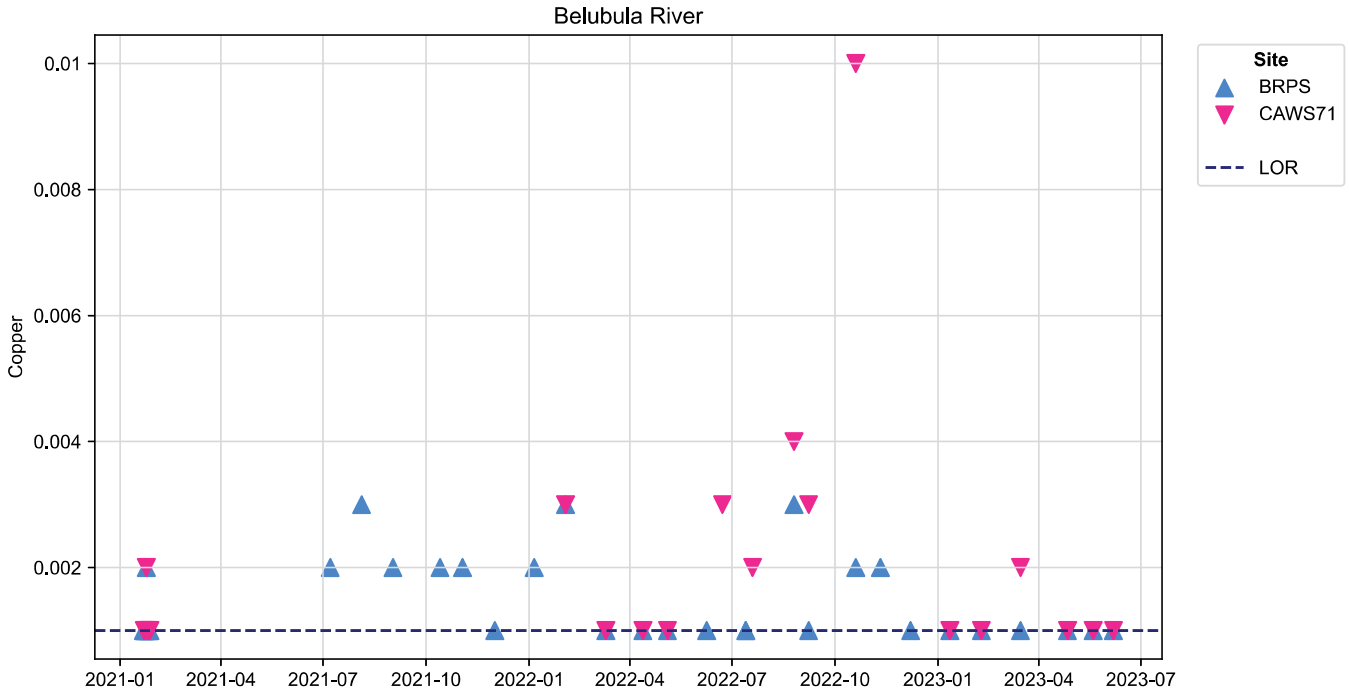

Belubula River
Cobalt
0.003
0.00275
0.0025
0.00225
0.002
0.00175
0.0015
0.00125
Site
BRPS
CAWS71
LOR


Belubula River
Copper
0.01
0.008
0.006
0.004
0.002
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
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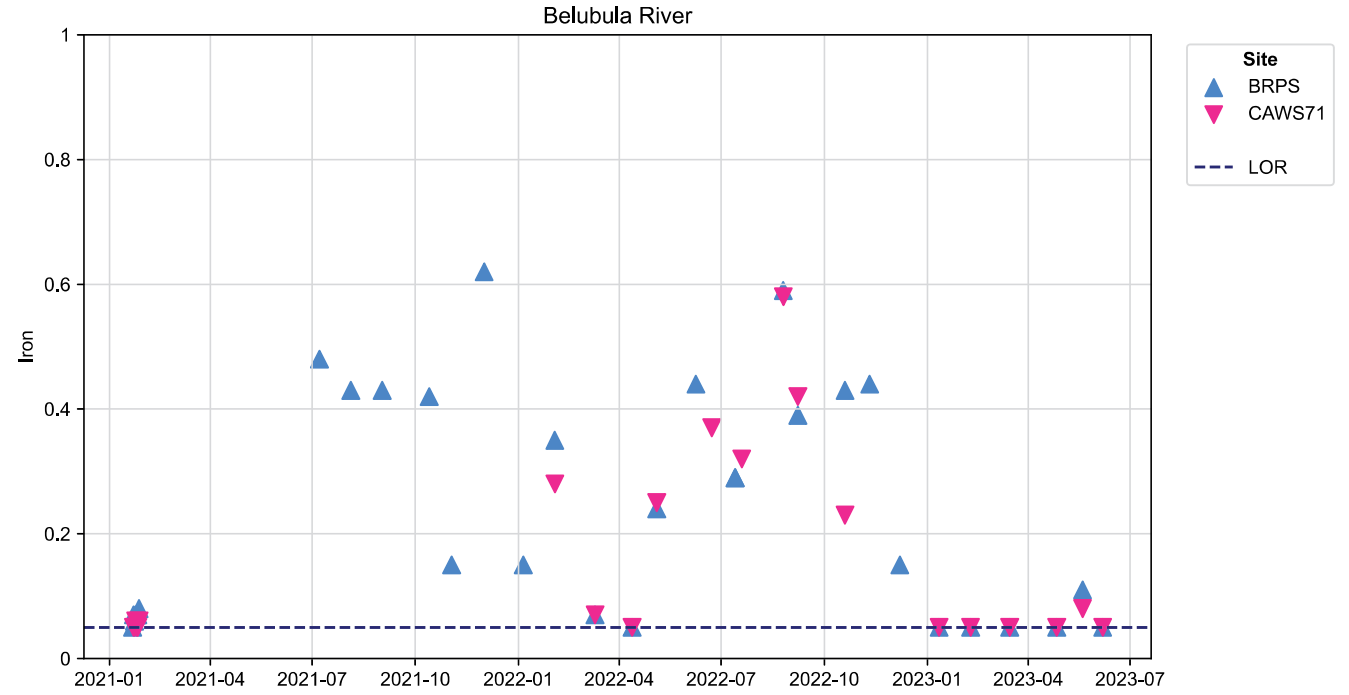
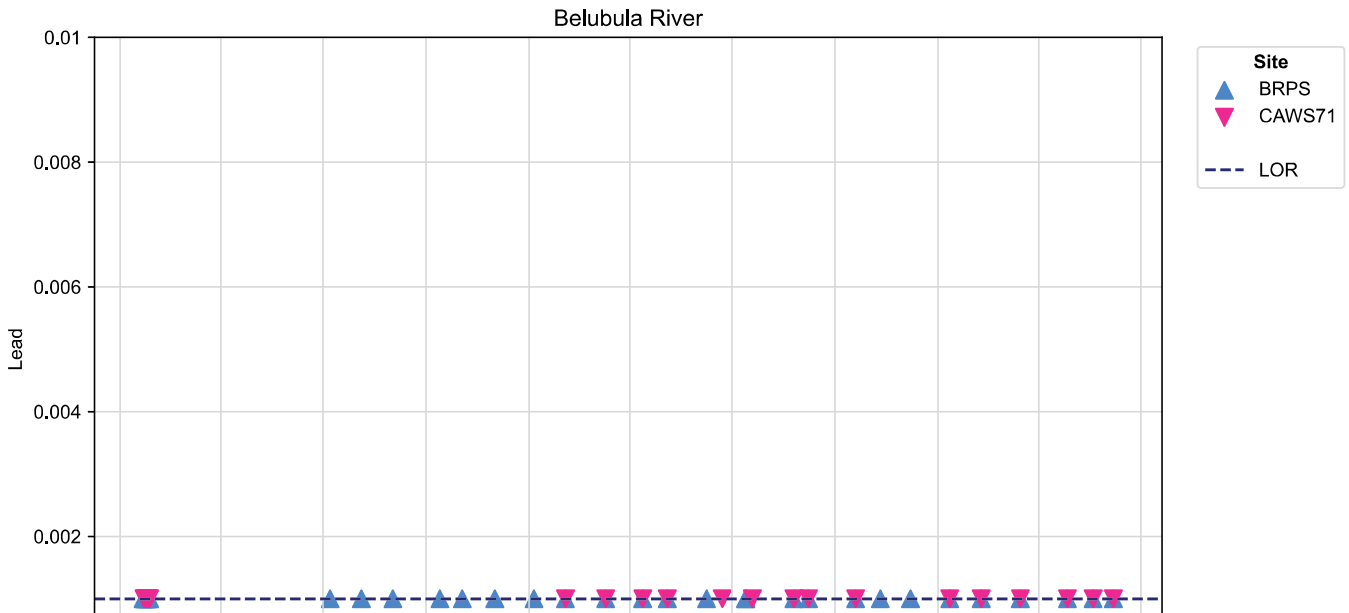
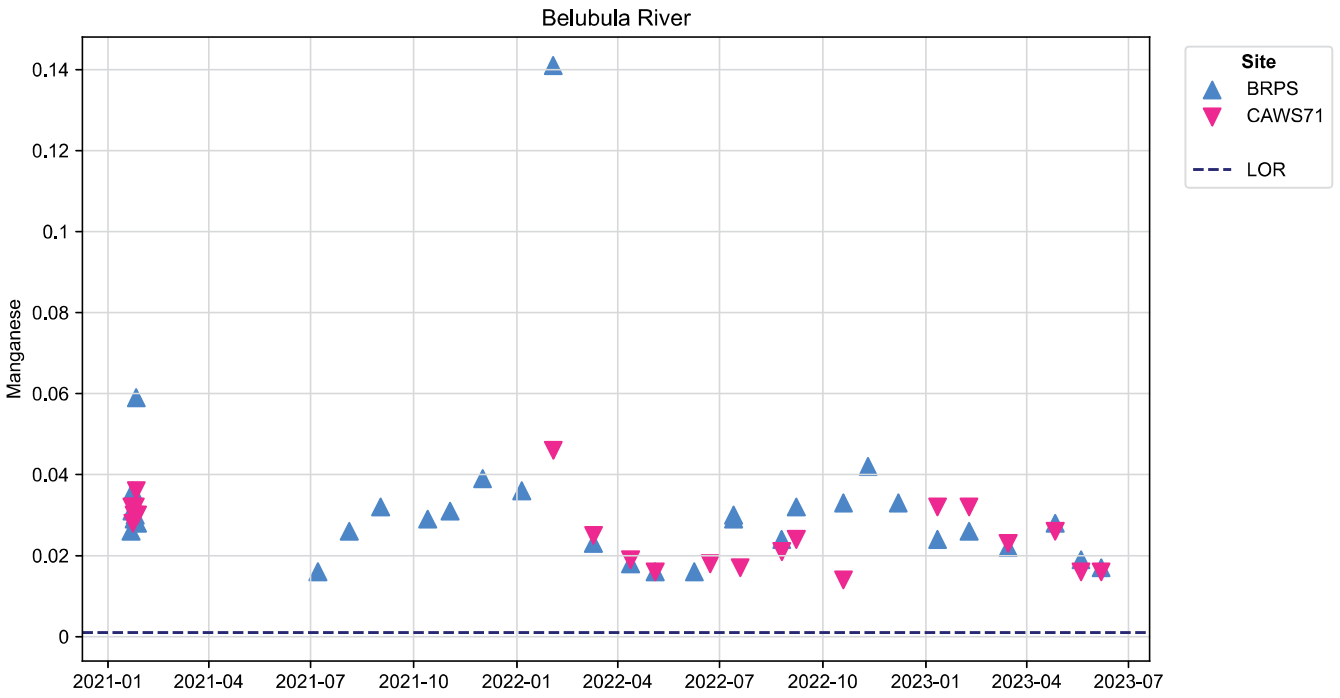
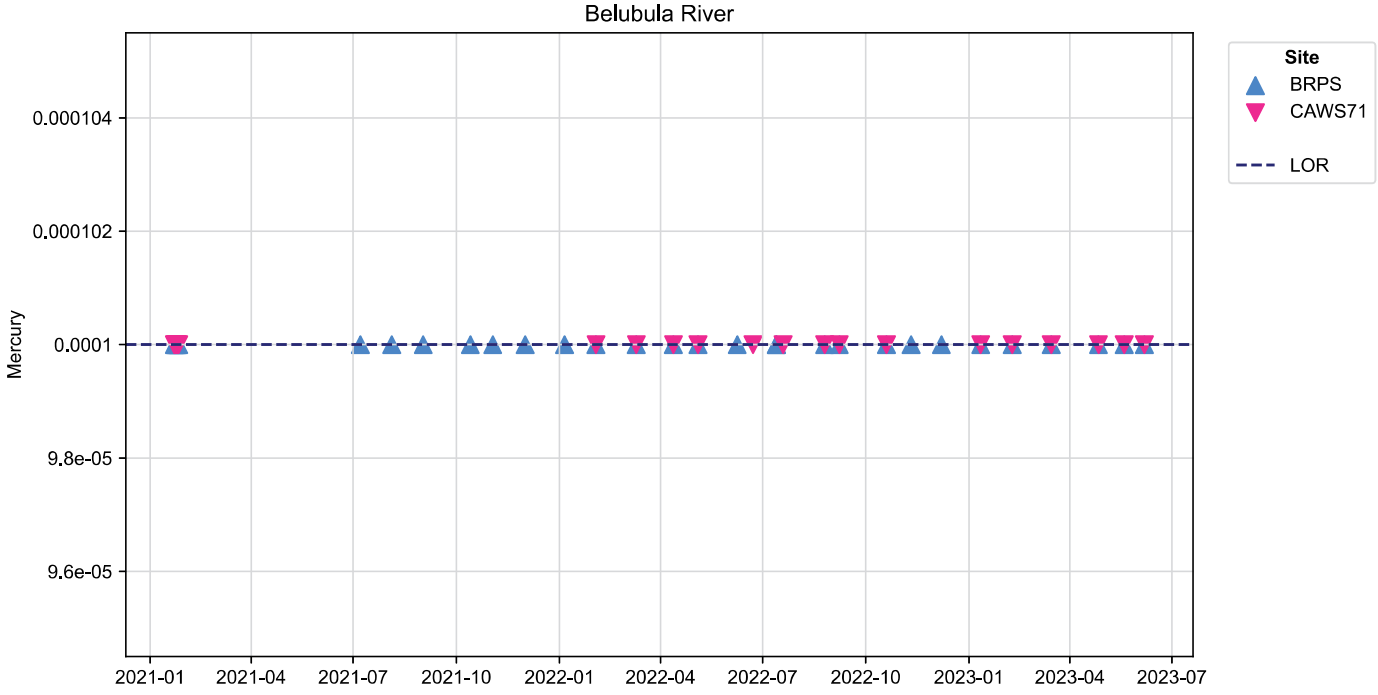
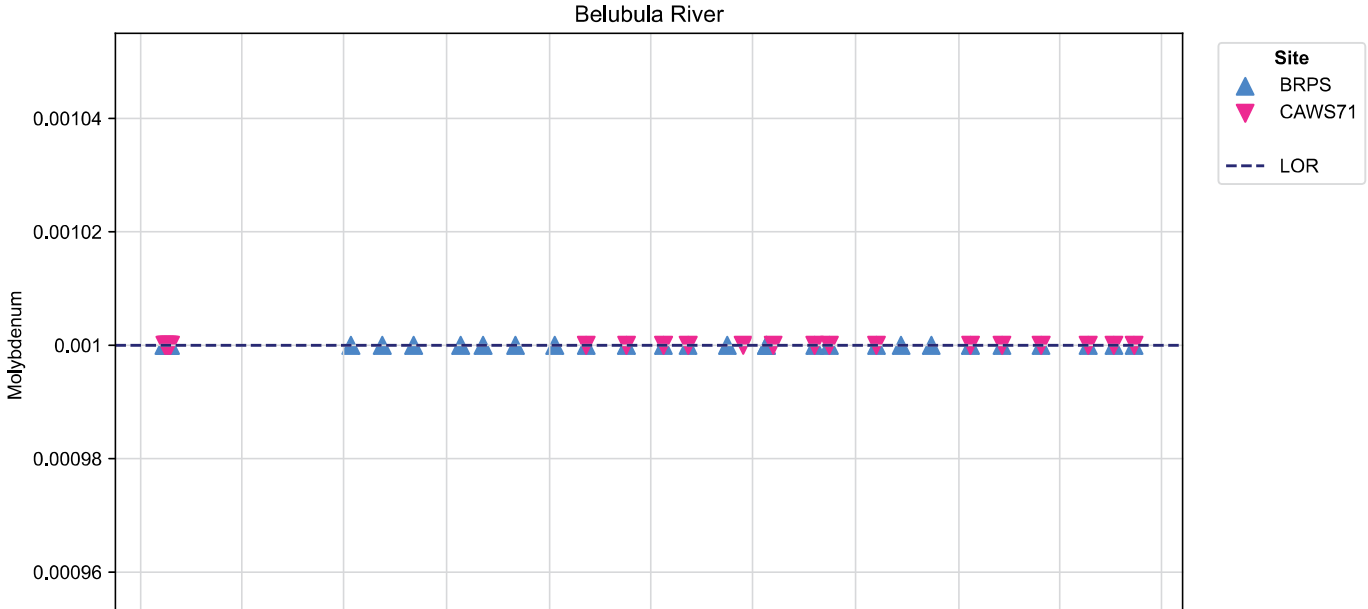
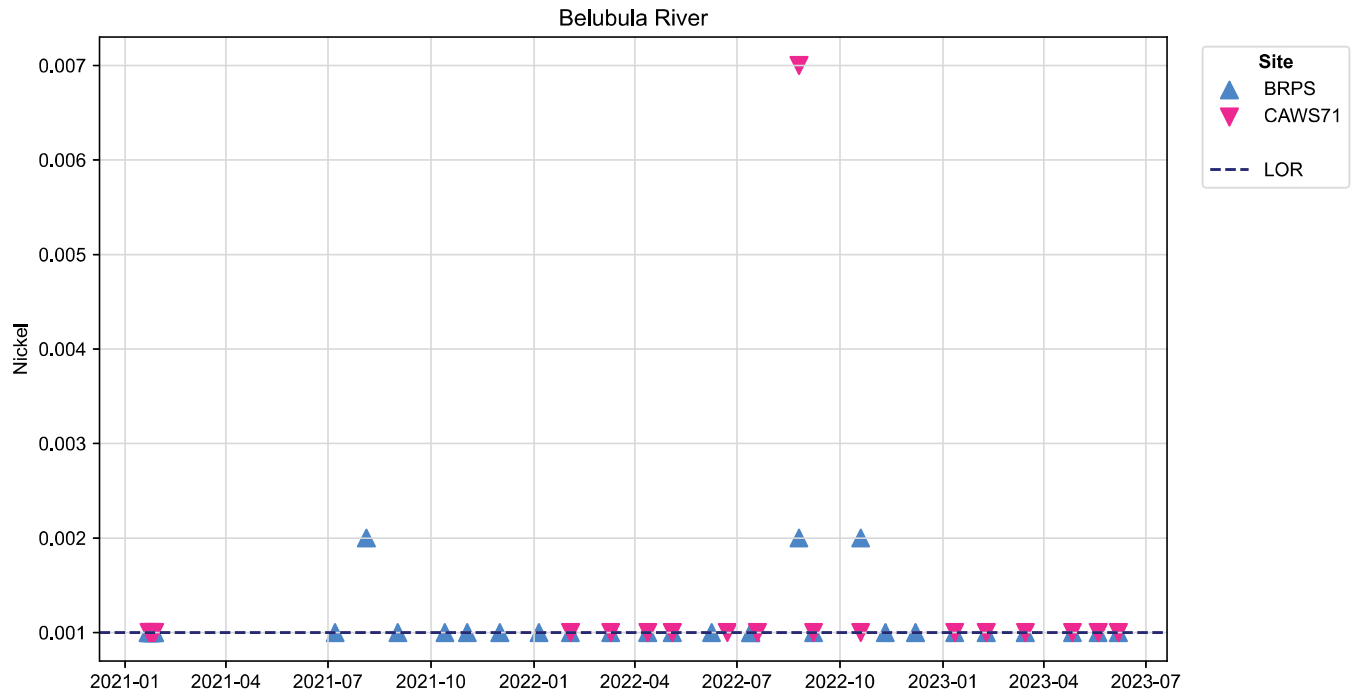

Belubula River
Iron
1
0.8
0.6
0.4
0.2
0
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR

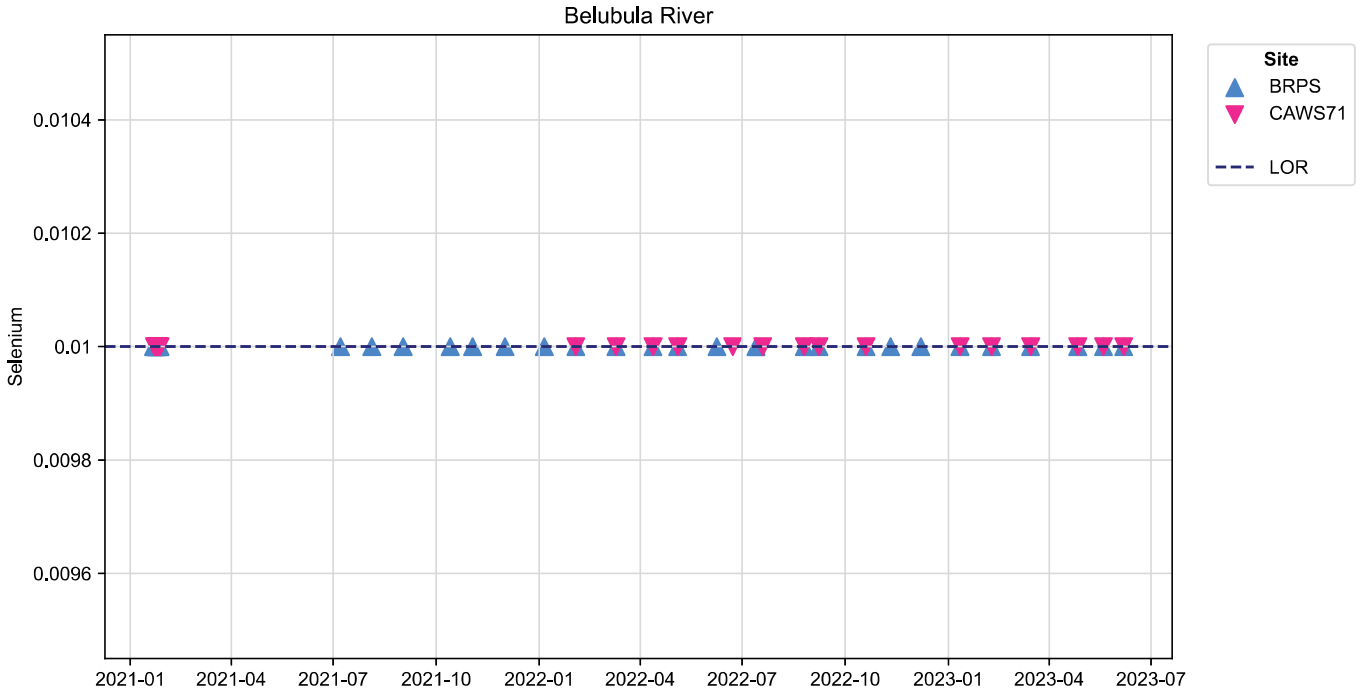

Belubula River
Lead
0.01
0.008
0.006
0.004
0.002
Site
BRPS
CAWS71
LOR

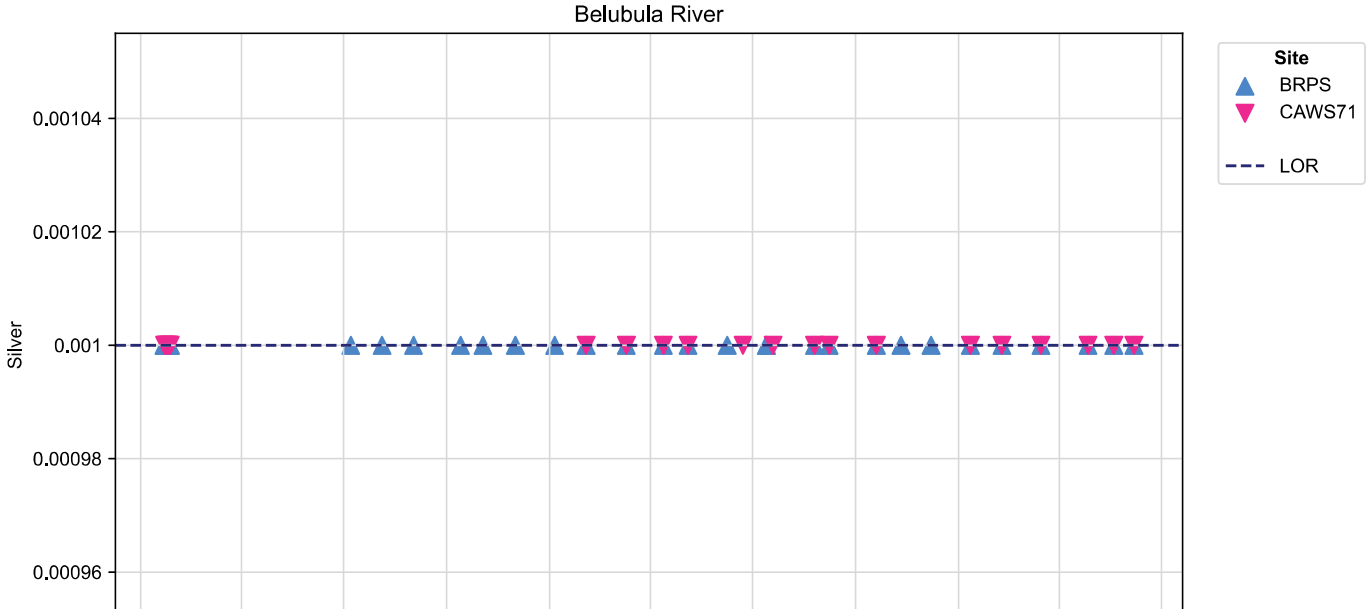

Belubula River
Manganese
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR

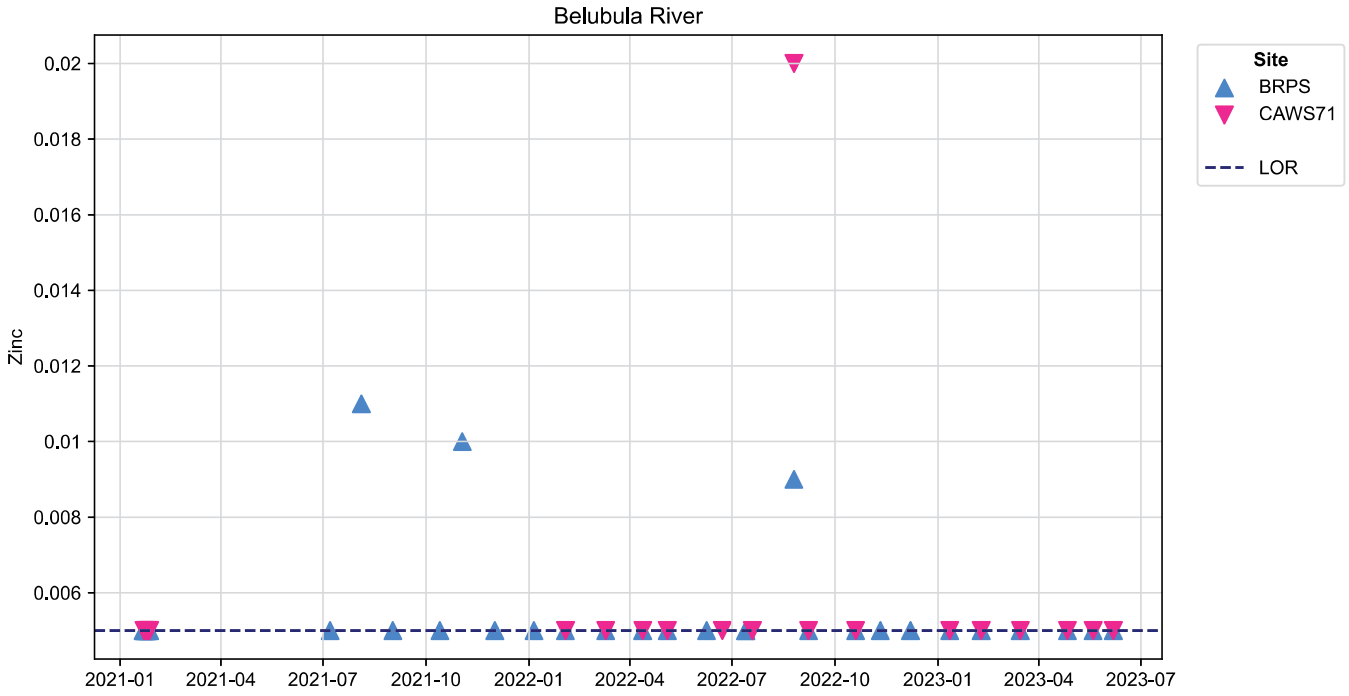

Belubula River
Mercury
0.000104
0.000102
0.0001
9.8e-05
9.6e-05
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR


Belubula River
Molybdenum
0.00104
0.00102
0.001
0.00098
0.00096
Site
BRPS
CAWS71
LOR


Belubula River
Nickel
0.007
0.006
0.005
0.004
0.003
0.002
0.001
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR


Belubula River
Selenium
0.0104
0.0102
0.01
0.0098
0.0096
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR


Belubula River
Silver
0.00104
0.00102
0.001
0.00098
0.00096
Site
BRPS
CAWS71
LOR


Belubula River
Zinc
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
2021-01
2021-04
2021-07
2021-10
2022-01
2022-04
2022-07
2022-10
2023-01
2023-04
2023-07
Site
BRPS
CAWS71
LOR

Project name		Cadia surface water assessment					
Document title		Report | Cadia surface water assessment - Belubula River					
Project number		12640002					
File name		12640002-REP_Cadia Belubula River surface water assessment.docx					
Status Code	**Revision**	**Author**	**Reviewer**		**Approved for issue**		
			Name	**Signature**	**Name**	**Signature**	**Date**
S4	0	T. Hopwood	S. Gray		S. Gray		10/05/24
S4	1	T. Hopwood	S. Gray		S. Gray		15/05/24
S4	2	T. Hopwood	S. Gray		S. Gray		24/05/24

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