Santos QNT Pty Ltd

EP161 – Drilling EMP Annual Groundwater Monitoring Data Review

17 May 2023 - Final

1. Introduction

Santos is the operator of Exploration Permit 161 (EP161) in the Northern Territory, Australia. EP161 is the subject of shale gas exploration targeting formations of the Beetaloo Sub-basin and is located approximately 120 km east of Daly Waters on the Carpentaria Highway and 600 km south-east of Darwin.

The Santos *Environment Management Plan: McArthur Basin Drilling Program STO2-7* (Santos, 2021) (the Drilling EMP) was approved on 21 February 2021. The Drilling EMP included exploration drilling activities at the Tanumbirini and Inacumba sites (Figure 1).

This report satisfies Condition 7 of the approval which requires:

An interpretative report of groundwater quality based on the groundwater monitoring required to be conducted at the well site(s) in accordance with Table 6 of the Code. The interpretative report must be provided annually within three months of the anniversary of the approval date of the EMP and include:

- *Demonstration that there is no change to groundwater quality or level attributable to conduct of the regulated activity at the well site(s);*
- *Interpretation of any statistical outliers observed from baseline measured values for each of the analytes;*
- *Discussion of any trends observed; and*
- *A summary of the results inclusive of descriptive statistics.*

The Code is in reference to the *Code of Practice: Onshore petroleum activities in the Northern Territory* (DENR, 2019). It is referred to as the "Code" throughout this report.

In summary, the interpretation and discussion of the observed outliers and trends identifies:

- This report includes all monitoring data acquired up to and including February 2023.
- Water levels in the control monitoring bore (CMB) and impact monitoring bore (IMB) remain within the range of background variability following execution of the regulated activities at the Tanumbirini site.
- There has been no impact to the beneficial use of the Gum Ridge Formation aquifer with respect to Livestock drinking water following execution of the regulated activities.
- There was a statistically significant increase in the dissolved methane concentration in the IMB during execution of the authorised activities, but the concentration has subsequently decreased. The dissolved methane concentration increased in the CMB from a starting concentration of less than the laboratory limit of reporting, but subsequently decreased to less than the limit of reporting. The maximum reported dissolved methane concentration (48 µg/L in the IMB) is an order of magnitude less than maximum concentration observed in pastoral bores elsewhere on Tanumbirini Station. The absence of propane and ethane is indicative that the methane is most likely not thermogenic in origin and therefore unlikely to come from the reservoir via the exploration wells. CSIRO has previously identified that dissolved methane in the Gum Ridge Formation – the same aquifer as the CMB and IMB – is biogenic methane.
- Changes in major ion and trace element chemistry and the temperature response in the IMB are indicative of a subtle influence of the drilling process on the groundwater quality. Similar changes were

observed following the drilling of the CMB and IMB. No influence of the hydraulic fracture stimulation was observed.

- No drilling activities or fracture stimulation activities have been performed at the Inacumba site.
- Rising trends have been observed in pH and other analyte concentrations at the Inacumba site however no regulated activities have been commenced by Santos at this site.
- There is a small but consistent correlation between analysed batches of samples and trace parameter concentrations across all results. This is expected where all analyte concentrations are extremely low. The correlation represents the variability in measurement accuracy which is consistent between batches of samples analysed by the laboratory.

2. Exploration activities

The locations of Santos activities on EP161 are shown on Figure 1.

Santos drilled the Tanumbirini 2H and Tanumbirini 3H exploration wells between May and November 2021. 'Tanumbirini 2' and 'Tanumbirini 3' are used throughout this report to refer to the vertical wells and their associated horizontals. Key dates associated with the drilling activities are summarised in Table 1, and are shown on Figure 2 and on the graphs in Attachment C.

The wells were drilled using mud rotary methods. The wells were initially drilled using water-based drilling fluids (mud) until lost circulation was encountered in the Cambrian Limestone Aquifer. At this point the drilling fluid was swapped to bore water with no drilling additives until the aquifer had been sealed off from the well. Water for drilling was sourced from RN040930, the CMB at the Tanumbirini site.

The wells underwent hydraulic fracture stimulation (HFS) in December 2021, flowback commenced immediately thereafter and continued to December 2022, when the wells were shut-in and remote monitoring commenced. Hydraulic fracture stimulation of the wells was approved under *McArthur Basin Hydraulic Fracturing Program NT Exploration Permit (EP) 161 STO3-8* (HFS EMP).

No drilling or hydraulic fracturing activities have been performed at the Inacumba site to date. Monitoring bores were installed at the Inacumba site in 2018 and 2019.

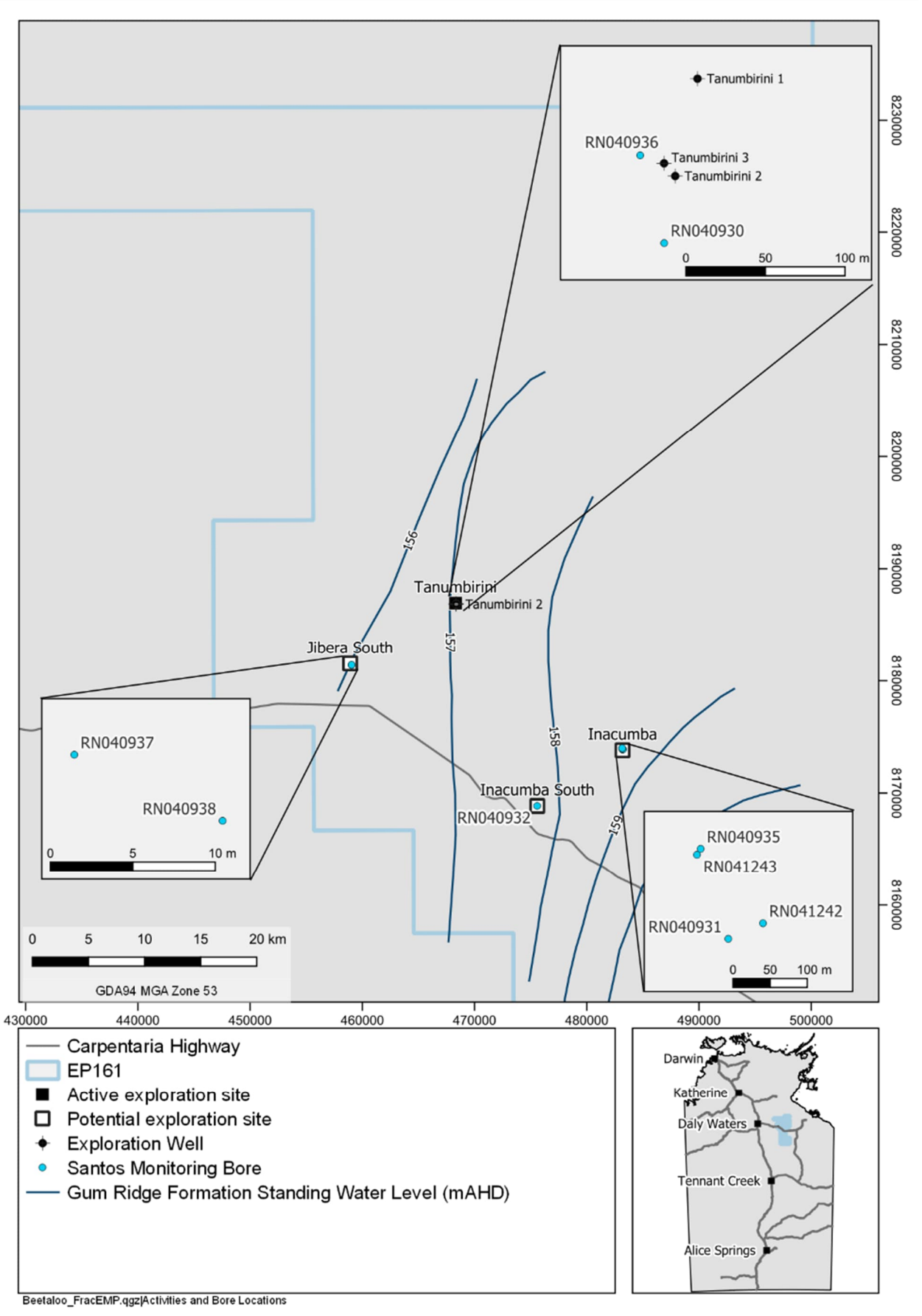
Santos has installed groundwater monitoring bores at the Jibera South and Inacumba South locations. No exploration activities have been approved or performed at these locations.

Table 1 Key dates of the EP161 exploration activities at Tanumbirini

Date	Event
11-May-21	Tanumbirini 2H start drilling (spud)
17-Aug-21	Tanumbirini 2H complete drilling (rig release)*
23-Aug-21	Tanumbirini 3H start drilling (spud)
19-Nov-21	Tanumbirini 3H complete drilling (rig release)*
1-Dec-2021	Hydraulic fracture stimulation (frac) start
19-Dec-2021	Hydraulic fracture stimulation end
19-Dec-2021	Flowback start
3-Dec-2022	Flowback end. Remote monitoring starts.

* drilling and well construction would have been completed several days prior to rig release

Figure 1 Activity and monitoring bore locations



3. Tanumbirini

This review focusses on the groundwater monitoring data acquired during the regulated activities performed on the Tanumbirini 2 and Tanumbirini 3 exploration wells. Data from prior to May 2021, when drilling commenced, was used to establish baseline groundwater conditions.

Monitoring Activities

In December 2018 and in accordance with the Guideline a control monitoring bore (RN040930 – 43 m from Tanumbirini 2) was installed at the Tanumbirini site, and the impact monitoring bore (RN040936 – 16 m from Tanumbirini 3) was installed in July 2019. Water level contours for the GRF were prepared using data collected by Santos (RDM Hydro, 2021) and indicate groundwater flow directions in the vicinity of Tanumbirini are from east-southeast to west-northwest (Figure 1). Both bores are installed to enable monitoring of the full thickness of the Gum Ridge Formation (GRF). The Anthony Lagoon Formation aquifer is not present at the Tanumbirini well pad.

Water level, temperature and conductivity (LTC) sensors were installed in the monitoring bores in September 2020 (prior to the approval of the Drilling EMP), replacing the previously installed sensors. A barometric pressure sensor was also installed at the site at this time. During background monitoring the sensors record every four hours. Condition 6 of the HFS EMP approval required *groundwater level/pressure monitoring at each impact monitoring bore established, using a logger to record water level for 2 weeks prior to, during, and 4 weeks after completion of hydraulic fracturing operations at each well pad. Data logging should record at a minimum of every 4 minutes for the duration of the recording period.* Accordingly, the datalogger, the recording interval in RN040930 and RN040936 was increased to four minutes from 29 September 2021 (62 days prior to the start of the HFS) to 2 February 2022 (45 days after the end of the HFS activity). It was then returned to a four-hourly recording interval. The original LTC logger failed in October 2022 and was replaced in January 2023. No logger data is available for the intervening period.

RN040930 was equipped with a dedicated electric submersible pump which is used for purging and sampling, at a pumping rate of 17 L/s. This bore was used for water supply throughout the regulated activities. The pump was replaced with a lower capacity sampling pump in December 2022.

RN040936 was constructed with sealed sub-surface headworks in a “gatic” in accordance with the Bore Work Permit. Prior to the commencement of the 2021 drilling program, an electric submersible pump was installed in the bore to allow baseline water quality monitoring. Because of its close proximity to the exploration wells (16 m from Tanumbirini 3, in accordance with the Guideline) and to allow the drill rig to operate, the pump was removed from the bore and the headworks sealed, therefore water quality monitoring could not be undertaken during drilling activities. The LTC sensor remained in the bore for the duration of the drilling campaign. The sampling pump was reinstalled during rig-down (at the end of drilling) and prior to the commencement of HFS activities.

Routine water quality monitoring of the bores commenced in July 2019. The suite of analysis is compliant with Table 6 of the Code and exceeds the requirements of the Guideline. RN040930 had been monitored 27 times and RN040936 had been monitored 10 times prior to the commencement of drilling in 2021. RN040930 has continued to be monitored for water quality at a quarterly interval. RN040936 was monitored on 16 March 2021, approximately 1 month before the drilling rig mobilised to site, and quarterly monitoring recommenced on 17 November 2021, after the completion of drilling of Tanumbirini 3, but prior to the HFS. Quarterly monitoring has continued through 2022 and 2023. A sample could not be collected from RN040930 in January 2023 due to a pumping equipment failure, however a sample was collected in February 2023 during a return visit. Nine samples have been collected from RN040930 and eight samples have been collected from RN040936 (two on the same day) since the start of the regulated activities.

Water level, temperature and electrical conductivity monitoring

The timing of sampling relative to exploration activities can be seen on Figure 2. The downhole sensor responses are described and interpreted as follows.

RN040930 (CMB)

- Groundwater extraction for water supply from RN040930 started on 6 April 2021. Extraction was initially during daytime hours only until the commencement of Tanumbirini 2 drilling. The frequency then reduced and become more intermittent. Extraction increased to fill storages prior to the HFS. During the HFS, extraction was effectively continuous. There has been infrequent, short-duration extraction only since the completion of the HFS in late December 2021.
- There are diurnal water level fluctuations of 2 mm to 12 mm in RN040930 due to barometric pressures changes.
- A water level drawdown of approximately 0.05 m (5 cm) was recorded within the bore during pumping of RN040930.
- There was a long-term *rising* trend of 0.2 m over the period of extraction, which appeared to cease approximately a month after extraction ceased and then stabilised. The change is too small to determine the potential cause with any confidence, but may be related to:
    - Seasonal barometric pressure changes, as shown by the declining barometric pressure between March 2021 and July 2021, followed by a period of relative stability and then a rising barometric pressure trend.
    - Regional water level trends as observed in NTG monitoring bores (accessed via the Water Monitoring Portal) screened in the Cambrian Limestone Aquifer around the Beetaloo Basin. These trends are shown on Figure 3. It is noted that no new water level data has been made available from the Water Monitoring Portal since October 2022.
- The logger failed in October 2022 and was replaced in January 2023. There is no logger data available from the intervening period.
- There was a rise in temperature of 0.2 °C during extraction, followed by a longer-term rise in the overall water temperature. Following extraction the temperature stabilised and then declined very gradually. The increased temperature indicates that the extracted groundwater is potentially coming from deeper in the bore than the sensor and pump intake (roughly 130m below ground). The increase in temperature in October 2022 is likely an artefact due to the replacement sensor being installed marginally deeper than the original sensor.
- The EC showed a correlation to the amount of pumping, with EC increasing in proportion to the amount of extraction. This may relate to differential depressurisation of discrete fractures within the limestone, and a change in the relative proportion of water provided by each fracture to the bore. The decline in the logger EC from October 2022 to January 2023 is related to a different calibration of the replacement sensor.

RN040936 (IMB)

- The overall water level response was similar to RN040930, but the overall rising trend was smaller, with a maximum increase of less than 0.05 m (5 cm).
- The influence of ongoing extraction over approximately 2 months can be seen as a small (~1 cm) decline in water level.
- Shortly after the start of drilling of Tanumbirini 2, there was a drop in water level, much like if the bore were being pumped (which lasted about a day), and then a flat signal.
- A small decrease in temperature (<0.05 °C) after the start of drilling of Tanumbirini 2 and a declining temperature after the start of drilling of Tanumbirini 3. These changes in temperature may be related to the influence of drilling fluids which were cooler than the aquifer water due to the former being stored on the surface.

- Step changes in the temperature response is due to changes in the logger depth. These changes are only 0.4 °C in total.
- The temperature and electrical conductivity in RN040936 are subtly affected by pumping in RN040930.
- There is a small (~1 cm) seasonal influence of barometric pressure on the water level trend.

Water quality monitoring

For each of RN040930 and RN040936, Attachment A includes a summary table that contains:

- A statistical summary of all groundwater quality results,
- The results of samples collected immediately prior to and after the start of drilling, and
- The P-value of the T-Test comparing the analyte results from pre the start of drilling and post the start of drilling.

A Before After/Control Impact (BACI) approach has been used to assess the potential effects of drilling activities on groundwater quality.

Gross alpha is the only parameter that exceeded its ANZECC (2000) livestock drinking water guideline value. It was exceeded in both the RN040930 and RN040936 including baseline water quality. Therefore, this exceedance is not related to drilling activities. Gross beta activity also exceeded the ANZECC (2000) livestock drinking water guideline value in one baseline water quality result from RN040930.

The groundwater quality results have been graphically presented as box-and-whisker plots (Attachment B). The statistics were calculated on all data up to and including 16 March 2021 (baseline data – prior to the start of drilling), with those results from samples collected post 16 March 2021 shown as individual symbols. The box-and-whisker plots were used to identify those parameters which exceeded the range of background variability in at least one sample. Where a parameter was identified to exceed the range of background variability, a timeseries chart was prepared (Attachment C), with results from other sites where Santos has installed monitoring bores provided for comparison (control sites). The timeseries charts for a parameter are scaled based on the maximum concentration across all of the sites. The trends identified in these charts are described in Table 2.

The timeseries charts mostly show no consistent trend in parameter concentrations. In some cases the baseline maximum is exceeded in the first sample collected after the drilling commenced, others the middle or the last. Sometimes the concentrations have decreased to less than the baseline maximum by the end of drilling. There appears to be correlations in the many of the parameter concentrations across all of the monitoring sites. This is most likely related to laboratory measurement uncertainties rather than changes in the aquifer as the monitoring bores are separated by distances of 10-20 km and show the same variations in concentrations. Laboratory measurement uncertainties are greatest when the concentrations are less than ten times the limit of reporting (i.e. the values are very low concentrations).

Since there is bias in the selection of the pre-activity maximum concentration, a statistical assessment was made using a Student T-Test to test whether there was a significant difference in the results before and after the start of exploration activities on Tanumbirini 2 and Tanumbirini 3. An F-Test was used to determine whether the homoscedastic (statistically similar variance) or heteroscedastic (statistically different variance) formula for the T-Test was used. Where a concentration was reported as less than the limit of reporting, the limit of reporting was assumed to be the sample concentration. The statistical significance was assessed to a 95% confidence. The results of the analysis are included in the statistical summaries in Attachment A. The bores and parameters where the P-value was less 0.05 (95% confidence that there is a significant different between the pre- and post-drilling data) are identified in Table 3. The parameters identified are generally consistent with those in which the maximum baseline concentration was exceeded. For some of the trace elements (metals/metalloids), there was a statistically significant *decrease* in the reported concentration, i.e. water quality improved following exploration activities.

The observed variability in major ion and trace element concentrations suggest a possible, but subtle, influence of the exploration activities on the groundwater quality in the vicinity of the wells. This influence is likely to be related to the drilling of the wells through the following mechanisms:

- **Drilling mud**: there were increases in potential indicators of the presence of drilling mud such as potassium, chloride, pH, alkalinity and barium.
- **Drill cuttings**: Mobilisation of ions and elements associated with the increased surface area of the cuttings relative to in-tact formation, and through the oxidation of the minerals from the oxygen rich drilling mud that had been stored in open tanks on surface. Wallis and Pichler (2018) and Poulsen et al. (2020) refer to these mechanisms in the literature. A similar influence on water chemistry could be seen in the evolution of the baseline water chemistry observed in most of the monitoring bores where declining trends in parameters were observed following drilling of the water bore itself, until a relatively stable baseline had been reached (RDM Hydro, 2022).

There were no significant changes to the groundwater chemistry that can be attributed to the regulated activities.

Figure 2 Tanumbirini - LTC timeseries monitoring data

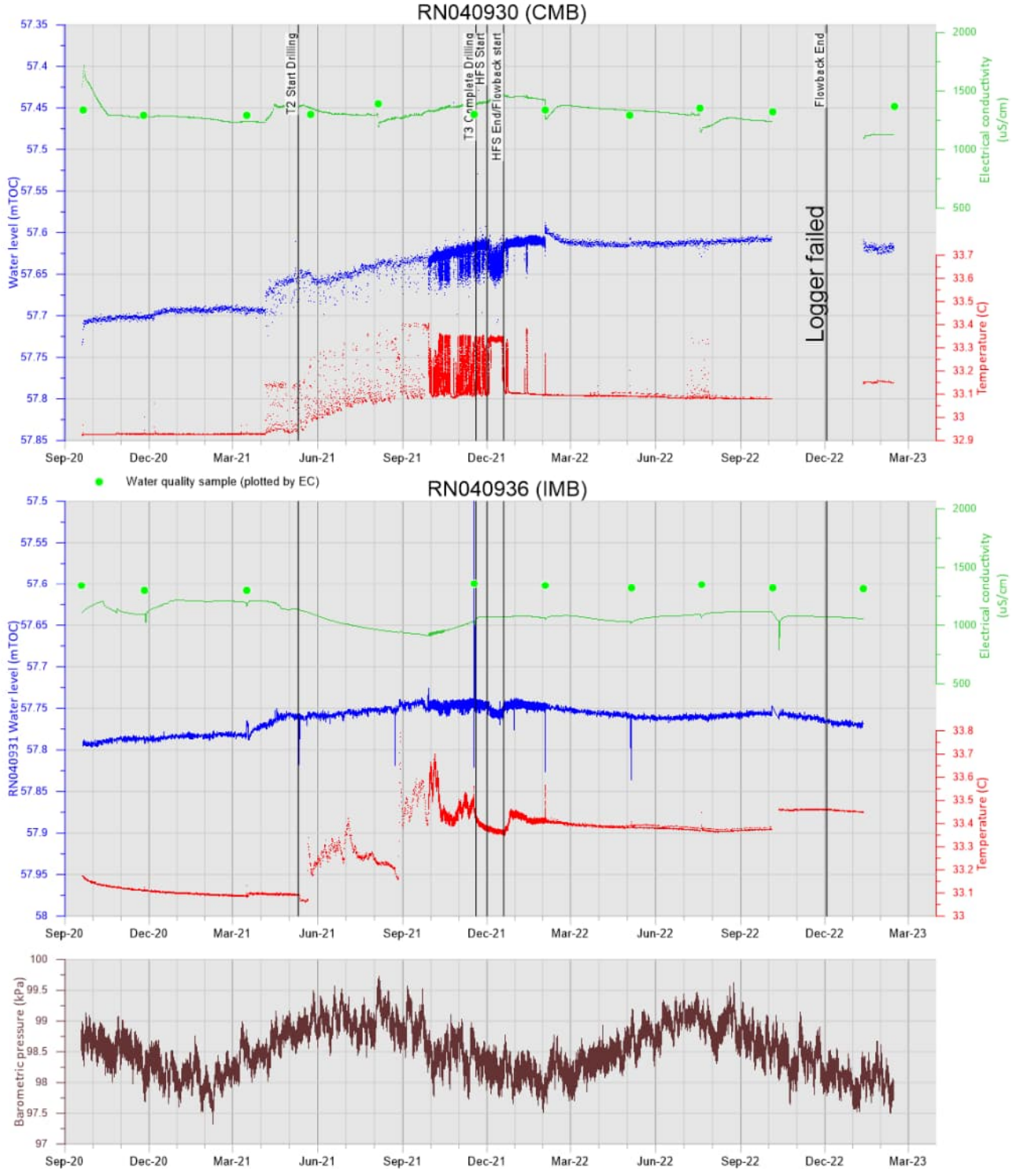


Figure 3 Regional groundwater level monitoring of the Cambrian Limestone Aquifer

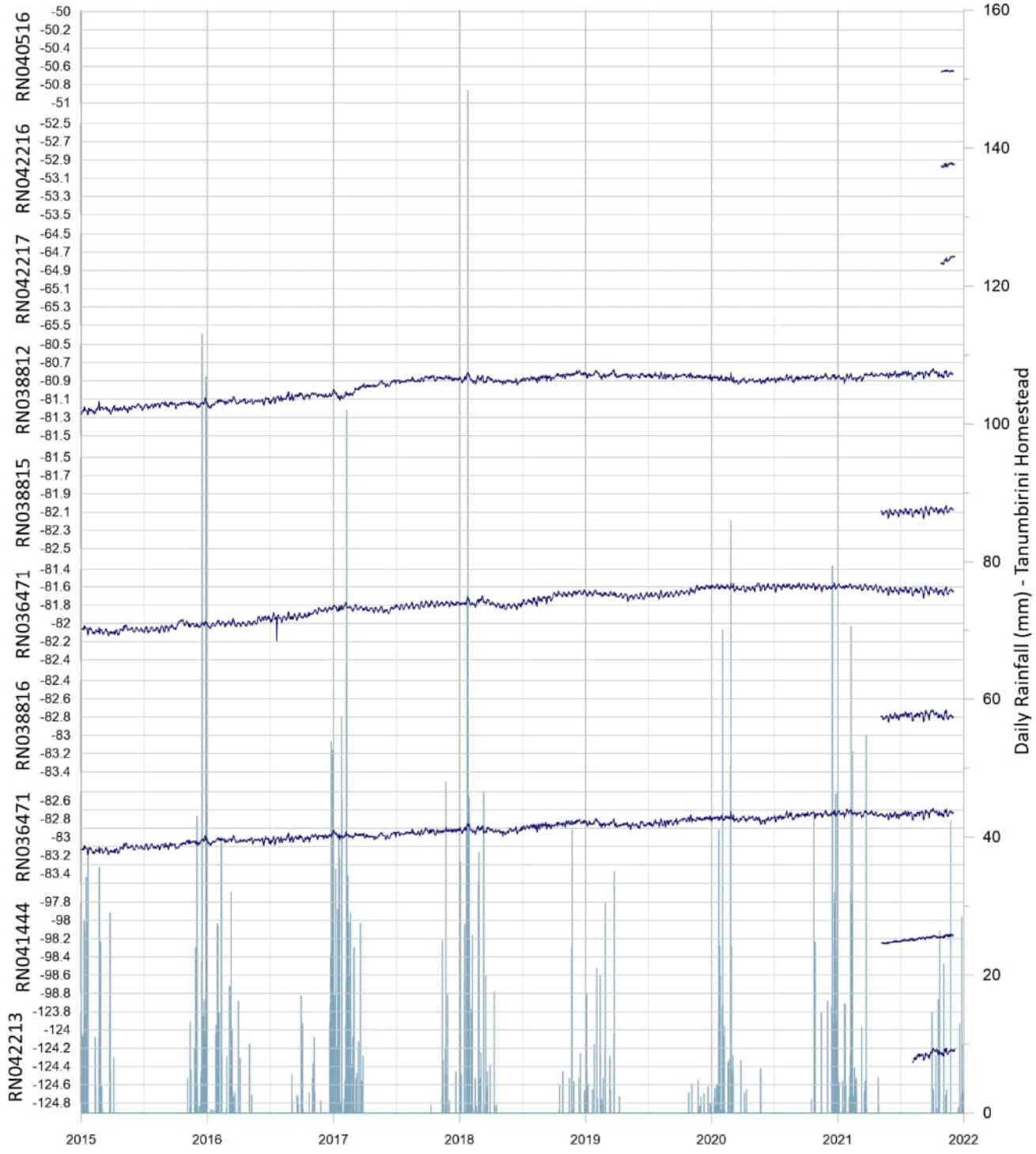


Table 2 Tanumbirini - Description of trends in parameters exceeding the baseline maximum concentration

Parameter (and fraction) exceeding baseline range in natural variability	Bore(s) in which exceedances were reported	Description
pH - Lab	RN040930 (CMB) RN040936 (IMB)	The laboratory pH measured in all three bores at Tanumbirini (CMB, IMB and RN038580) was reported to increase during both drilling and HFS activities, but then declined in February 2021 to within the range of background variability before increasing to ~pH 7.9 in May 2022, dropping again in July 2022, following which it showed in increasing trend. The most recent reported pHs were 7.9 from the CMB (February 2023) and 7.79 from the IMB (January 2023). Similar trends in pH were observed across the other Santos monitoring sites.
Chloride		Both the CMB and IMB chloride concentrations increased marginally during activities and exceeded their pre-activity maxima. In the first sample collected post HFS, the concentrations decreased to less than their pre-activity averages, but then increased again to their maximum reported concentrations prior to showing a declining trend and then a rising in concentration in the most recent samples so slightly greater than the pre-activity. The difference between the pre- and post-activity concentrations are not significantly different. The chloride concentration in RN038580 rose very slightly after the start of drilling but declined to less than the pre-activity concentrations after the start of the flowback, but has increased again in the most recent sample. Chloride results from Jibera South, Inacumba and Inacumba show similar trends across all aquifers, with trends also similar to those observed from Tanumbirini.
Sodium		The sodium concentration remained consistent in the CMB and IMB throughout the drilling and first six months of flowback. In July 2022 there was a slight rise in the sodium concentration in both the CMB and IMB, with the sodium concentration remaining slightly higher through the second half of 2022. Similar rising trends in sodium concentrations are observed in the results from results from Jibera South, Inacumba and Inacumba South.
Potassium		Potassium concentrations in the CMB increased to its maximum reported value in the first sample after the start of drilling, but then deceased to within the background range, although on a slight rising trend to the end of the HFS. The IMB showed a similar rising trend through the drilling and HFS activities. The potassium concentration in both bores decreased in the first two samples following the HFS but show an upward trend in the two subsequent (and most recent samples), followed by more recent declining trends. Samples form the other sites and all aquifers show similar rising trends through 2022.
Calcium		Calcium concentrations effectively remain consistent in both the CMB and IMB from once the bore chemistry stabilised after drilling and through the drilling activities. Consistent with calcium concentrations from the other sites (Jibera South, Inacumba and Inacumba South), calcium concentrations were reported to decrease from after the start of the flowback, prior to increasing from May 2022 to greater than the pre-activity maxima. The most recent samples (January/February 2023) from the CMB and IMB were less than the peak concentration but were still greater than the pre-activity concentrations.
Methane (dissolved)		Dissolved methane concentrations in the IMB have shown steadily declining trends from the peak in February 2022 of 48 µg /L. The most recent (January 2023) IMB concentration was 15 mg/L as compared with a pre-activity maximum of µg mg/L. The most recent (February) CMB dissolved methane concentration increased to 3 mg/L whereas the previous two samples were <LOR. The IMB and RN038580 reported dissolved low methane concentrations prior to the commencement activities. Prior to the activities, the CMB had previously only reported concentrations <LOR. The maximum reported concentration was 48 µg/L in the IMB. In February 2022, two samples were collected from the IMB, the first after 3 well volumes of purging, the second after 6 well volumes. The second sample showed a ~20% decrease in methane concentration to 37 µg/L. RN038580 concentrations showed a declining trend from November 2019 through to August 2021 (during drilling activities) to a local minimum concentration of 2 mg/L. Thereafter the concentration slowly increased to 6 mg/L in May 2022, prior to declining again in July 2022 to 4 mg/L and rising to 6 µg/L in January 2023. Results from other Santos monitoring sites, where there have been no exploration activities, show variable methane concentrations. RN040938 showed an increase trend from <LOR to a peak of 37 µg/L, followed by a decrease over 6 months to 10 µg/L. All results from the most recent samples (October 2022) were <LOR.
Boron (dissolved)		The CMB reported a maximum concentration (0.21 mg/L) in the first sample following the start of drilling, as compared with its pre-activity maximum of 0.19 mg/L. The concentration decreased to 0.19 mg/L (May 2021) and 0.18 mg/L (November 2021) before increasing again to 0.2 mg/L in February 2022. In the IMB, the pre-activity maximum reported boron concentration was 0.19 mg/L. The reported concentration prior to the HFS (November 2021) was 0.19 mg/L and was 0.2 mg/L in February 2022. The CMB and IMB dissolved boron concentrations then move in concert, with declining trends to October 2022 when they report 0.16 mg/L and rising to 0.18 mg/L in January/February 2023. In RN038580, the dissolved boron concentration decreased from a pre-activity maximum of 0.19 mg/L to 0.13 mg/L in February 2022, but increased to follow the same trends as the CMB and IMB from May 2022. Since February 2022, the dissolved boron concentration reported a decreasing concentration in all Santos monitoring bores, however samples were not available from Inacumba, Inacumba South and Jibera South in January 2023.
Copper (dissolved)		Following stabilisation of background concentrations (after December 2019) the dissolved copper concentration were <LOR in the CMB and IMB. The first sample after the end of drilling (December 2021) reported the presence of dissolved copper in both the CMB (0.004 mg/L) and IMB (0.001 mg/L). Since those samples, dissolved copper concentrations in the CMB and IMB were <LOR, except for the IMB reporting a maximum concentration in May 2022 of 0.014 mg/L. RN038580 had previously reported a dissolved copper concentration <= LOR. Dissolved copper concentrations from the other Santos monitoring bores are generally <LOR, however concentrations >LOR have been reported.
Boron (total)	RN040930 (CMB)	The CMB reported a total boron concentration (0.27 mg/L) during the drilling of Tanumbirini 2 exceeding its pre-activity maximum (0.22 mg/L) in August 2021. The concentration decreased to 0.16 mg/L in November 2021 (prior to HFS) but increased again to 0.2 mg/L in February 2022 and then declining to 0.14 mg/L in October 2022, but rising to 0.18 mg/L in January 2023. The reported total boron showed a declining trend through the activities to January 2021, but then increased to its maximum reported concentration (0.28 mg/L) in July 2022. The concentration decreased to 0.17 mg/L in October 2022 but rose to 0.21 mg/L in January 2023. RN038580 reported total boron concentration in February 2022 (0.21 mg/L) that exceeded its pre-activity maximum (0.19 mg/L). The concentration then declined, but increased again to 0.21 mg/L in January 2023. Total boron concentrations in the other Santos monitoring bores show similar variability in trends across the bores and sites, suggesting a potential non-aquifer influence on the reported concentrations.
Copper (total)	RN040930 (CMB)	The total copper concentration in the CMB peaked at 0.031 mg/L in the last sample prior to drilling and exhibited a declining trend during the drilling and HFS program. The concentration was <LOR in May 2022, but then spiked up to 0.16 mg/L in July 2022, and reduced to 0.043mg/L in October 2022 and was report <LOR in the most recent sample (February 2023). Total copper concentrations in other monitoring bores have been <=LOR, except in the most recent samples where very low concentrations have been reported.
Electrical conductivity at 25°C	RN040936 (IMB)	The electrical conductivity (EC) of the groundwater in the Gum Ridge Formation at the Tanumbirini site is approximately 1,300 µS/cm, with the three bores showing slight variations over time, generally in concert with each other. The maximum reported EC in the IMB was 1,360 µS/cm, as compared with its maximum prior to the start of activities of 1,340 µS/cm and minimum of 1,280 µS/cm. The most recent concentration has decreased to 1,290 µS/cm, only marginally greater than the pre-activity minimum. The maximum reported EC in the CMB was 1,410 µS/cm prior to activities starting, and 1,390 µS/cm during activities. The most recent EC was 1,370 µS/cm. Both the CMB and RN038580 displayed some variability in their reported ECs, generally moving in concert, except for their most recent samples which were collected at different dates. Bores at other sites also reported slight variations in EC over time and in concert with each other suggesting potential variations in the laboratory sensor calibrations
Total Dissolved Solids @180°C		The TDS concentrations reported from the IMB have varied in concert with the CMB. The maximum reported pre-activity TDS from the IMB was 878 mg/L, with a maximum concentration of 920 mg/L reported from the first sample collected following drilling in November 2021. The reported TDS from the IMB decreased to 826 mg/L after the completion of the HFS (July 2022), but increased in the two samples since (October 2022 and January 2023) with the last sample reporting a TDS of 916 mg/L. The February 2023 concentration in the CMB was 859 mg/L TDS and generally shows a similar trend to the IMB. The most recent concentration (January 2023) in RN038580 was 859 mg/L TDS and shows a similar trend to the CMB and IMB.
Bicarbonate Alkalinity as CaCO3		The dominant major anion in the groundwater in the Gum Ridge Formation is bicarbonate. The maximum bicarbonate concentration in the IMB (435 mg/L) was reported from the November 2021 sample, compared with a pre-activity maximum of 420 mg/L. The bicarbonate concentration decreased to 423/421 mg/L in the two samples collected in February 2022 and continued to decline, with a the most recent sample (January 2023) reporting 386 mg/L. All other bores reported increased bicarbonate concentrations in November 2021 compared with the prior sample and have show declining trends and minimum concentrations in their more recent samples.
Magnesium		The magnesium concentrations in the IMB, CBMA and RN038580 reported effectively flat trends following the establishment of baseline conditions in Q1 2019 and very slightly declining trends from the start of drilling through to the July 2022 samples. The most October 2022 samples reported relatively higher concentrations in all Santos monitoring bores, with the IMB exceeding its pre-activity maximum (60 mg/L compared with 59 mg/L). The most recent (January 2023) concentration in the IMB was reported as 54 mg/L.
Reactive Silica		The reactive silica concentration in the IMB exhibited a very slight rising trend from 22.9 mg/L in March 2021 to 25.1 mg/L October 2022, but reported a decrease concentration in January 2023 of 24.3 mg/L. The maximum pre-activity concentration was 24.9 mg/L. Reactive silica concentrations show more variability between the Santos monitoring bores than most other parameters.
Gross alpha		The pre-activity maximum reported Gross alpha concentration in the IMB was 0.82 Bq/L with the maximum concentration (0.93 Bq/L) reported in July 2022. The concentration in the IMB has subsequently reduced 0.66 Bq/L in January 2023. Gross alpha shows some variability in reported concentration magnitude in all monitored bores. The CMB reported an increased concentration during drilling to a maximum of 0.91 Bq/L in August 2021, but a decreased concentration in the November 2021 sample (0.6 Bq/L). This is compared with a “stabilised” baseline maximum concentration of 0.86 Bq/L in September 2021.

Parameter (and fraction) exceeding baseline range in natural variability	Bore(s) in which exceedances were reported	Description
		The IMB and CMB gross alpha concentrations have moved in concert since February 2022.
Gross beta		The gross beta concentration in the IMB reported a declining trend from a 0.39 Bq/L peak in July 2020 (prior to the start of drilling) to 0.24 Bq/L in November 2021, after the completion of the drilling activities. In the first sample following the HFS (February 2022) the concentration increased to 0.36 Bq/L, decreased to 0.31 Bq/L in May 2022 and then increased to its reported maximum of 0.44 Bq/L in July 2022 prior to declining to 0.34 mg/L in October 2022. The most recent sample report a concentration of 0.36 Bq/L. Gross beta concentrations show some consistencies in concentration trends between the monitoring bores, but are less correlated than many of the other parameters where this occurs.
Barium (dissolved)		The pre-activity maximum reported concentration of dissolved barium (0.05 mg/L) was only exceeded in the IMB (0.051 mg/L) in November 2021 declining to 0.040 mg/L in May 2022, increasing to 0.049 mg/L in July 2022 and then decreasing in the subsequent two samples. The most recent sample report a concentration of 0.047 mg/L. A similar trend was reported from the CMB, reaching a maximum of 0.048 mg/L during activities compared with a pre-activity maximum of 0.05 mg/L. The most recent concentration was 0.04 mg/L in February 2023. There is some discrepancy in trends between the IMB, CMB and RN038580. Barium is ubiquitously present in the groundwater samples collected across the Santos monitoring bores. The maximum reported dissolved barium concentration (0.137 mg/L) reported from RN040938 at Jibera South is approximately 4 times greater than the concentrations reported from the Tanumbirini site.
Aluminium (total)		Total aluminium was reported <LOR in the IMB in all samples prior to activities starting. One of the samples collected in February 2022 reported 0.02 mg/L whereas the other reported <LOR (0.01 mg/L). The CMB reported total aluminium in the August 2021 sample (0.02 mg/L), but had previously had a reported concentration of 0.03 mg/L. Both the IMB and CMB have reported <LOR since February 2022. Significantly higher dissolved aluminium concentrations have been reported from the other Santos monitoring bores, generally from the first sample collected, where the concentration may be influenced by the presence of solids resulting from the drilling of the bore. Concentrations are generally =LOR or <LOR.
Barium (total)		In the IMB, the total barium concentration exceeded the pre-activity maximum (0.049 mg/L) in the November 2021 (0.05 mg/L) and the two samples collected in February 2022 (0.086 mg/L and 0.055 mg/L). The total barium concentration has remained greater than the pre-activity maximum but has shown a declining trend since February 2022. The most recent (January 2023) total barium concentration reported for the IMB was 0.052 mg/L. The CMB reported some variability in total barium concentration through the activities (0.044-0.04 mg/L), but the concentration did not exceed the pre-activity maximum (0.049 mg/L), and has shown only a marginally increasing trend since the end of activities, rising from 0.047 mg/L to 0.049 mg/L between February and October 2022.The most recent sample (February 2023) reported 0.046 mg/L. Total barium concentrations are routinely greater at Jibera South and Inacumba South as compared with Tanumbirini.
Chromium (total)		Prior to activities commencing, the IMB reported total chromium <LOR. The November 2021 sample reported 0.002 mg/L total chromium. The concentration reduced to <LOR in February 2022 and has remained <LOR throughout 2022, including the most recent sample from January 2023 The CMB total chromium concentration was also <LOR throughout 2022 and the most recent sample collected in February 2023. Most other Santos monitoring bores report total chromium that fluctuate between <LOR and =LOR.
Molybdenum (total)		Prior to activities commencing, the IMB reported total molybdenum <LOR. The November 2021 sample reported 0.003 mg/L total molybdenum. The concentration reduced to <LOR in February 2022 and has remained <LOR throughout 2022, including the most recent sample from January 2023 The CMB total molybdenum concentration has remained <LOR since March 2020 when it stabilised post the drilling of the bore. Most other Santos monitoring bores report total molybdenum <LOR. RN040931 at Inacumba consistently reports total molybdenum in the range 0.002-0.004 mg/L. RN040938 at Jibera South reported a maximum dissolved molybdenum concentration of 0.02 mg/L prior to declining to <=LOR.
Strontium (total)		The total strontium concentration in the IMB has moved in concert with the concentration in the CMB. Pre-activity maximum concentrations were reported in September 2020 (IMB 0.876 mg/L and CMB 0.859 mg/L). Minimum concentrations were then reported in the next sample, collected in November 2020. The concentrations in both bores prior to the start of drilling, but remained less than the pre-activity maxima. Concentrations remained relatively stable during drilling and then increased to 0.87 mg/L / 0.861 mg/L in the IMB/CMB respectively in February 2022. Concentrations then declined in May 2022 prior to showing an increasing trend from then on. The maximum concentration from the CMB of 0.878 mg/L was reported in October 2022, with a decrease to 0.797 mg/L in February 2023. The concentration in the IMB continued to increase to its maximum of 0.88 mg/L in January 2023. Similar concentrations and trends in total strontium are observed across all monitoring bores.

LOR - limit of reporting; <LOR – less than the LOR; =LOR – equal to the LOR; >LOR – greater than the LOR
CMB = RN040930; IMB=RN040936

Table 3 Parameters with a significant difference between pre- and post-activity concentrations

Bore	Parameter	Comment
RN040930 (CMB)	Electrical Conductivity - Field	Post-activity mean concentration less than pre-activity mean
	Total Dissolved Solids @180°C	
	Potassium	
	Reactive Silica (dissolved)	
	Methane	
	Boron (dissolved)	
	Cobalt (dissolved)	Post-activity mean concentration less than pre-activity mean
	Nickel (dissolved)	Post-activity mean concentration less than pre-activity mean
	Cobalt (total)	Post-activity mean concentration less than pre-activity mean
	Iron (total)	Post-activity mean concentration less than pre-activity mean
	Uranium (total)	Post-activity mean concentration less than pre-activity mean
RN040936 (IMB)	Electrical Conductivity @ 25°C	Post-activity mean concentration less than pre-activity mean
	Total Dissolved Solids @180°C	
	Potassium	
	Reactive Silica (dissolved)	
	Methane	
	Nickel (dissolved)	Post-activity mean concentration less than pre-activity mean
	Strontium (dissolved)	
	Uranium (dissolved)	Post-activity mean concentration less than pre-activity mean
	Arsenic (total)	Post-activity mean concentration less than pre-activity mean
	Barium (total)	
	Manganese (total)	
	Uranium (total)	Post-activity mean concentration less than pre-activity mean

4. Inacumba

There have been no drilling or HFS activities at Inacumba. The Inacumba site is approximately 20 km to the east of Tanumbirini.

Monitoring Activities

Monitoring activities target two formations at the Inacumba site.

Gum Ridge Formation (GRF)

A control monitoring bore (RN040931 – up hydraulic gradient of the proposed well locations) was installed in the Gum Ridge Formation (GRF) at the Inacumba site in December 2018 and a future impact monitoring bore (RN040935 – down hydraulic gradient of the proposed well locations) was installed in July 2019. Both bores are installed across the full thickness of the Gum Ridge Formation (GRF) in accordance with the Guideline.

Water level, temperature and conductivity (LTC) sensors were installed in the monitoring bores in September 2020, replacing previously installed sensors that were found to provide unreliable data. The sensors record at four hourly intervals. The LTC sensor in RN040931 failed in November 2022 and was replaced in January 2023. There is no data available for the intervening period

RN040931 was equipped with a dedicated electric submersible pump which is used for purging and sampling, at a pumping rate of ~0.5 L/s, however the bore cannot sustain this pumping rate. Routine water quality monitoring of RN040931 commenced in late July 2019. The suite of analysis exceeds the requirements of the Guideline and is compliant with Table 6 of the Code. RN040931 has been sampled 27 times. A sample could not be collected in February 2022 as the site was not accessible due to wet weather. The pump was removed from the bore in December 2022 and the last sample available for RN040931 was collected in October 2022.

RN040935 was constructed as a future IMB with sealed sub-surface headworks in a “gatic” in accordance with the Bore Work Permit. There is no pump installed in this bore and no water quality samples have been collected.

Inacumba Aquifer (IA)

Santos, working with the NTG (Tickell, 2020), identified a previously unrecognised stratigraphic interval, informally called the Inacumba Unit. The Inacumba Unit comprises a red-brown siltstone overlying a clean limestone. The Inacumba Unit has been encountered at the Tanumbirini and Inacumba exploration sites, where it is up to ~200 m thick, but is not known further west. A control monitoring bore (RN041242) and a future impact monitoring bore (RN041243) were installed in the Inacumba Unit aquifer in September 2019.

Water level, temperature and conductivity (LTC) sensors were installed in the monitoring bores in September 2020. The sensors record at four hourly intervals. The LTC sensor in RN041243 failed in August 2022 and was replaced in January 2023. There is no data available for the intervening period.

RN041242 was equipped with a dedicated electric submersible pump which was used for purging and sampling, at a pumping rate of 17 L/s. Routine of water quality monitoring of RN041242 commenced in October 2019. The suite of analysis exceeds the requirements of the Guideline and is compliant with Table 6 of the Code. RN041242 had been sampled 11 times. A sample could not be collected in January 2022 as the site was not accessible due to wet weather. The pump was removed from the bore in December 2023. The last sample available from RN041242 was collected in October 2022.

RN041243 was constructed as a future IMB with sealed sub-surface headworks in a “gatic” in accordance with the Bore Work Permit. There is no pump installed in this bore and no water quality samples have been collected.

Water level, temperature and electrical conductivity monitoring

The timing of sampling relative to exploration activities can be seen on Figure 2. The downhole sensor responses are described and interpreted as follows.

- There is a slight seasonal fluctuation in water level that lags behind but follows barometric pressure
- The following diurnal variations in water level (approximate) can be observed:
    - RN040931 (GRF) – 0.05 m (5 cm)
    - RN040935 (GRF) – 0.025 m (2.5 cm)
    - RN042142 (IA) – 0.07 m (7 cm)
    - RN042143 (IA) – 0.07 m (7 cm)
- There is an approximately 0.05 m decline in overall water levels in the GRF and 0.1 m decline in the IA
- An earthtide response can be seen in the data from RN040935, RN042142 and RN042143
- The temperature and conductivity response in RN042142 indicate that pumped water is coming up the bore from deeper in the formation, and that the deeper water may be more saline than shallower water within the same geological formation. This is indicative of fracture dominated flow.
- The electrical conductivity measured by the sensor in RN040931 is roughly 250 µS/cm greater than the field measured electrical conductivity. Both sets of data show similar effectively flat trends. The offset is likely to relate to a different calibration on the downhole sensor. The field measured electrical conductivity is considered the more reliable measurement as the portable meter is routinely calibrated each field visit.
- The LTC sensor in RN040931 failed in November 2022 and was replaced in January 2023. There is no data available for the intervening period.
- The LTC sensor in RN041243 failed in August 2022 and was replaced in January 2023. There is no data available for the intervening period.

Figure 4 Inacumba Gum Ridge Formation (GRF) - LTC timeseries monitoring data

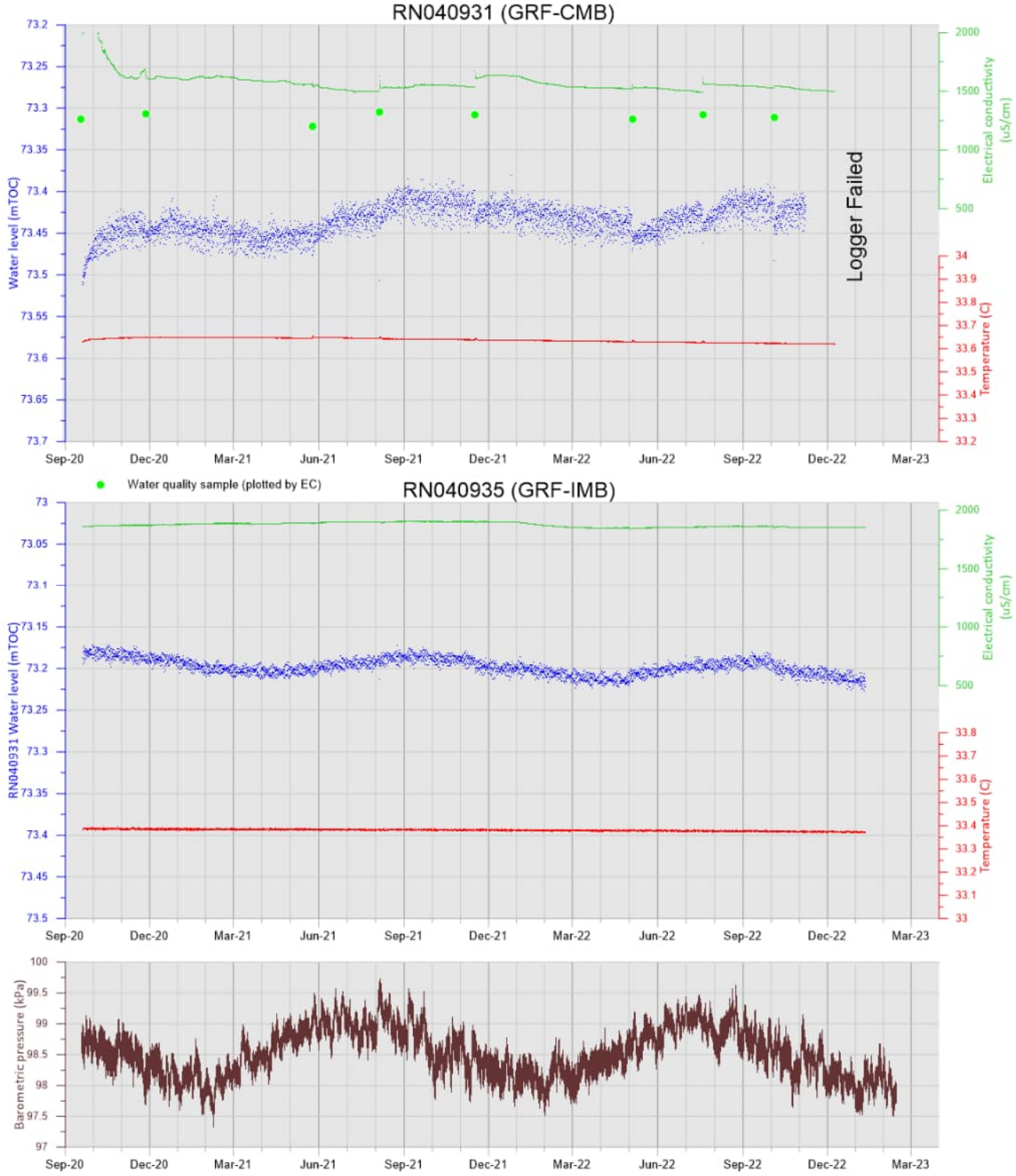
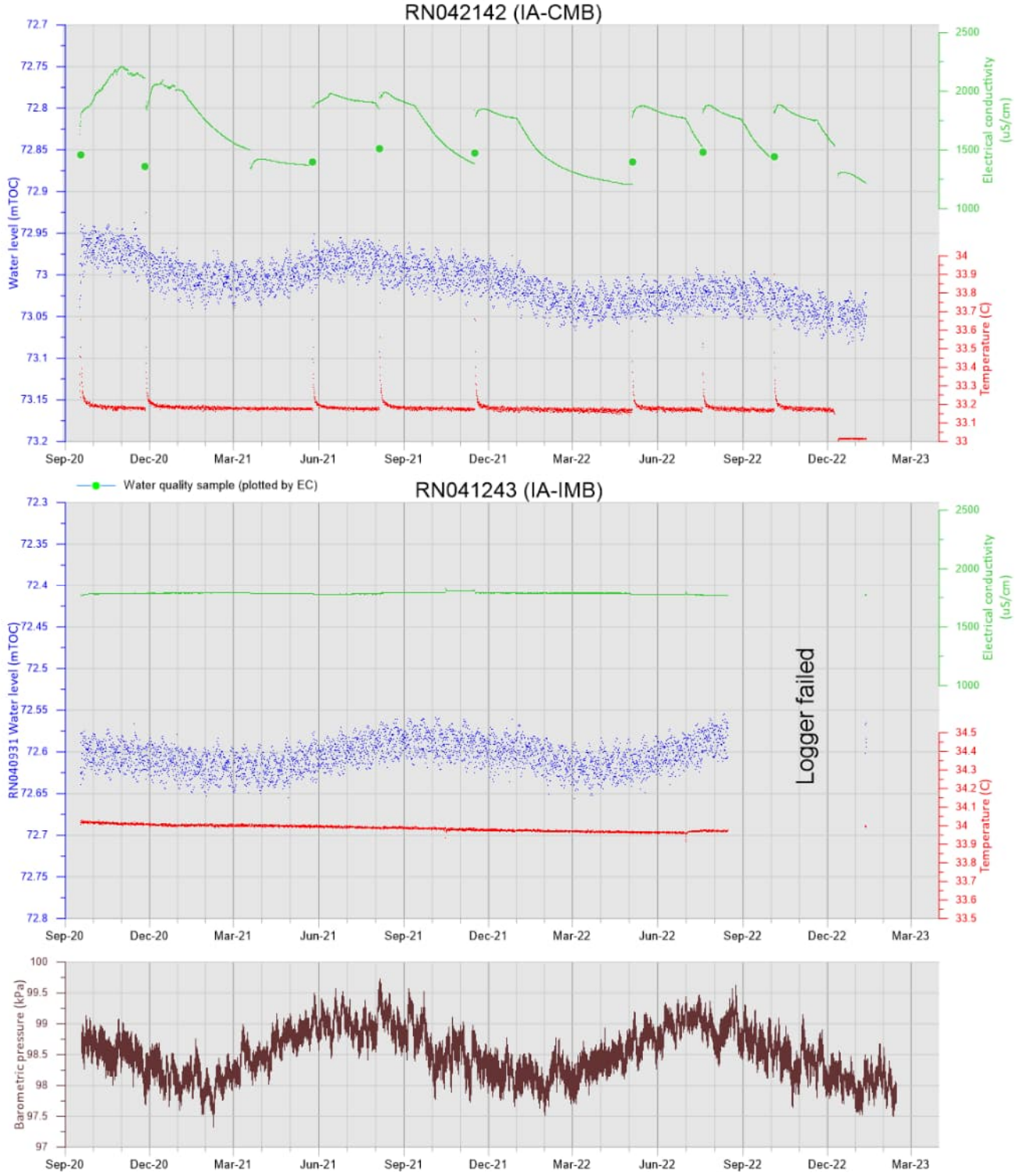


Figure 5 Inacumba Aquifer (IA) - LTC timeseries monitoring data



Water quality monitoring

There have been no drilling or HFS activities at Inacumba.

The most recent samples available from the bores at Inacumba are from October 2022 as the pumps were removed from the bores in December 2022.

Statistical summaries of the water quality results are provided in Attachment A. In lieu of assessing potential changes to water quality associated with exploration activities, the Mann-Kendall test for trend has been performed for all analytes for each of RN040931 and RN041242. Where the Mann-Kendall test has identified a rising trend (i.e. there appears to be a deterioration in the reported water quality), a time-series chart has been prepared and the data qualitatively described in Table 4

Table 4 Inacumba - Description of timeseries data for those analytes with a rising trend

Bore in which exceedances were reported	Parameter with rising trend	Description of trend
RN040931 (Gum Ridge Formation)	pH – field	The field pH was quite variable when routine sampling commenced in Jul 2019, showing an overall steeply declining trend to a minimum of 6.4. The field pH then rose to ~pH 8, where it was relatively stable, except for an anomalously low reading in September 2020. The field pH has shown a slight declining trend through 2022.
	pH - laboratory	The laboratory measured pH exhibits similar trends to the field pH. The value of the laboratory measured pH is generally approximately 0.5 pH units greater than the field measured pH. This is likely due to volatilisation of dissolved carbon dioxide, a weak acid, that is commonly observed effervescing in the groundwaters collected from the Gum Ridge Formation
	Carbonate alkalinity	Carbonate alkalinity has mostly been reported at <LOR except for one sample in January 2022 and for 3 samples from August 2021, October and 2021 and February 2022 where concentrations peaked at 20 mg/L. The two most recent samples (July and October 2022) were both <LOR.
	Potassium	The potassium sample collected immediately after drilling contained 22 mg/L potassium. The concentration rose from 25 mg/L to 33 mg/L as the bore continued to be sampled, and then gradually declined to 26 mg/L between January 2020 and July 2022. Most recent sample report a concentration of 28 mg/L.
	Methane (dissolved)	Dissolved methane was report <LOR in all samples prior to October 2021. The concentration rose to a maximum of 5 mg/L in May 2022, declining to 20 mg/L in July 2022 and <LOR in October 2022.
	Lithium (dissolved)	The dissolved lithium concentration has fluctuated between 0.4 mg/L and 0.5 mg/L except for a few lower concentration outliers. The most recent sample (0.48 mg/L) contained lower than the maximum reported concentration (0.51 mg/L).
	Molybdenum (total)	The maximum total molybdenum concentration (0.05 mg/L) was reported from the sample immediately after drilling. When routine sampling commenced, concentrations were generally 0.002 mg/L, but reduced to <LOR in January 2020. Concentrations rose to a maximum of 0.004 mg/L in May 2021 and remained less than this concentration but >LOR since.
RN041242 (Inacumba Aquifer)	Gross alpha	The gross alpha concentration has fluctuated between roughly 0.8 Bq/L and 1.2 Bq/L. The two most recent samples reported 1.17 Bq/L and 1.26 Bq/L in Jul and October 2022 respectively.
	Iron (dissolved)	The dissolved iron concentration exhibited a gradually increasing concentration from 0.14 mg/L in October 2019 to 0.38 mg/L November 2021. The May 2022 sample report <LOR followed by 0.5 mg/L in July 2022, reducing to 0.35 mg/L in October 2022.
	Manganese (dissolved)	The dissolved manganese concentration has risen from 0.004 mg/L in the first sample collected to a maximum of 0.019 mg/L in May 2022. The concentration has since declined to 0.01 mg/L.
	Iron (total)	The total iron concentration reports a generally gradually increasing trend from the first sample (0.17 mg/L) collected in October 2019, through to 0.4 mg/L in May 2022. In July 2022m a maximum concentration of 0.7 mg/L was reported, reducing to 0.56 mg/L in October 2022.
	Manganese (total)	The total manganese concentrations and trends are very similar to the dissolved manganese concentrations and trends.

5. Dissolved methane

Santos has analysed 288 individual samples for dissolved methane across its monitoring bores and from pastoral bores baselined and routinely monitored on Tanumbirini Station and the adjacent O.T. Downs (Beetaloo) station. This includes bore baseline and routine monitoring of pastoral water bores and Santos monitoring bores. Methane was detected in 93 of those samples (32 %). Dissolved methane has been detected in all monitored formations (Anthony Lagoon Formation, Gum Ridge Formation, Inacumba Aquifer and Proterozoic Bedrock) before and after drilling, and before and after HFS activities. The maximum reported dissolved methane concentration was 777 µg/L, from RN037666 (a station bore) that is more than 50 km to the northeast of the Tanumbirini site, compared with a maximum reported concentration of less than 50 µg/L at the Tanumbirini site. Methane saturation in water at atmospheric pressure is 20,700 µg/L at 30 °C (Walker and Mallants, 2014), which is the concentration required for free gas to be present.

Timeseries data shows a rise trend in the reported dissolved methane concentrations in the Tanumbirini IMB (RN040936) and CMB (RN040930) over the period of the exploration activities, followed by a decline in concentration from February 2022 to January and February 2023. The IMB reported a maximum concentration of 48 µg/L and the CMB a maximum of 16 µg/L. The CMB dissolved methane concentration declined to less than the limit of reporting in October 2022 and the reported concentration was 16 µg/L in the IMB at that time. The IMB concentration has continued to decline, with the most recent sample (January 2023) reporting 15 µg/L. Despite the IMB concentration report <LOR in July and October 2022, the February 2023 sample reported 3 µg/L. RN038580 is also at the Tanumbirini site and exhibited a rising and then falling trend in reported methane concentrations with a maximum reported concentration of 6 µg/L in July 2022. The peak concentration lagged behind the IMB and CMB. The concentration decreased in October 2022, and then rose again to 6 µg/L in January 2023. A maximum concentration of 20 µg/L (CSIRO, 2019) was reported from RN038580 prior to the commencement of drilling. Low concentrations of dissolved methane were detected in the IMB and RN038580 prior to the commencement of drilling, however dissolved methane had not previously been detected in the CMB.

While the dissolved methane concentrations temporarily increased at the Tanumbirini exploration site, the detected dissolved methane concentrations remain less than concentrations observed elsewhere across EP161. A timeseries comparison of the methane concentrations from Santos's regular monitoring of pastoral bores and those at the Tanumbirini exploration site is shown on Figure 6 and the spatial distribution of methane concentrations from all Santos monitoring activities (including bore baselines) are shown on Figure 7. From these figures, it can be seen:

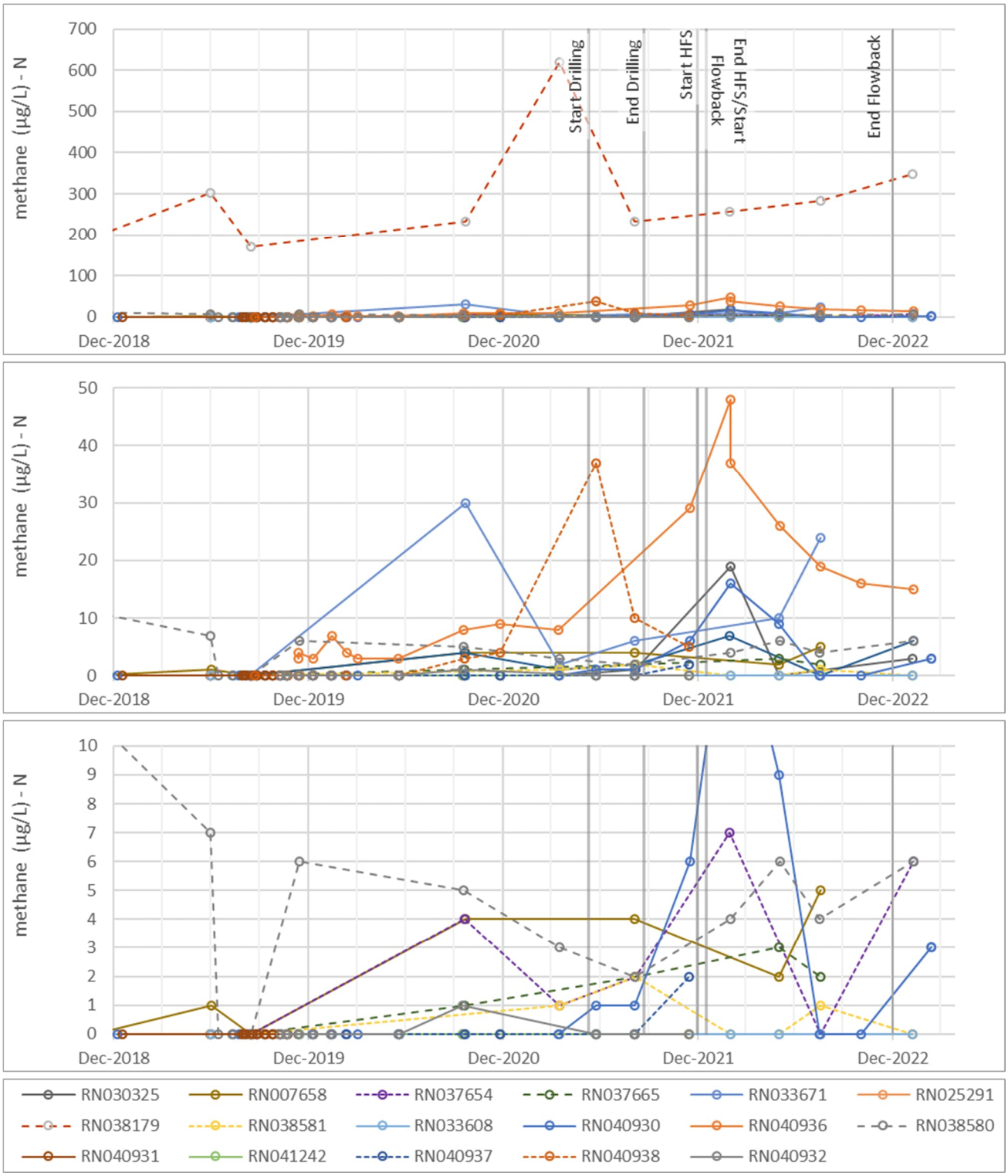
- Dissolved methane has been detected in all monitored formations (Anthony Lagoon Formation, Gum Ridge Formation, Inacumba Aquifer and Proterozoic Bedrock) before and after drilling, and before and after HFS activities.
- There is no apparent spatial pattern to the distribution of dissolved methane concentrations.
- The maximum reported dissolved methane concentration was 777 µg/L, from RN037666 (a station bore) that is more than 50 km to the northeast of the Tanumbirini exploration site.
- RN038179 (11 km southwest of the Tanumbirini site) routinely reports dissolved methane concentrations greater than 200 µg/L, with a maximum concentration of 620 µg/L reported in March 2021. CSIRO (2019) reported a concentration of 379 µg/L from RN038179 (sampled in October 2018).
- RN030325 (3.6 km from Tanumbirini), RN040937 (10.8 km from Tanumbirini) and RN037654 (24.3 km from Tanumbirini) also report rising dissolved methane concentrations over the equivalent period to the drilling and HFS activities (May 2021 to February 2022), albeit at lower concentrations compared with the Tanumbirini site. The dissolved methane concentration in RN040937 was <LOR in October 2022 and RN030325 was reported 3 µg/L in January 2023 (its most recent sample), having increased from <LOR in May 2022.
- RN040938 reported an increasing trend from <LOR to a peak of 37 µg/L in May 2021, followed by a gradual decrease to 1 µg/L in October 2022 (most recent sample)

- RN033761 reported an increasing trend from <LOR to a peak of 30 µg/L, followed by a decrease to less than 10 µg/L in the following two samples. From March 2021 the reported concentration increased to 10 µg/L in May 2022, and was reported to be 24 µg/L in July 2022.
- RN040931 (the GRF CMB at Inacumba) reported 5 µg/L in May 2022 and 2 µg/L in July 2022. All other samples prior to and post these dates, the reported dissolved methane concentrations were <LOR.
- Of the bores that are routinely sampled by Santos, only six bores have never reported dissolved methane greater than the limit of reporting (RN040939, RN041242, RN025291, RN033608, RN035502).
- Dissolved methane concentrations may reduce to less than the limit of reporting, and then increase again. These changes may occur between consecutive samples (every three or six months depending on the bore) or over a longer period. RN037654, RN030325, RN040930 reported concentrations to have increased from <LOR from the immediately prior sample to detectable concentrations in January 2023.

CSIRO (2019) collected 25 samples for dissolved methane in October to November 2018. The CSIRO (2019) limit of reporting was 0.2 µg/L as compared with the 1 µg/L at which Santos's results are usually reported. CSIRO reported the presence of methane in all the samples it collected. It found that concentrations were generally less than 10 µg/L, but concentrations up to 1129.5 µg/L were present. Stable isotope composition of the methane in the two samples analysed (RN031397 and RN038179) indicated that the presence of methane was due to microbial activity. RN038179 is on Tanumbirini Station and is included in the Santos regional monitoring program. CSIRO (2020) identified that methanogenic organisms (i.e. methane producing organisms) are naturally occurring within the groundwater of the Cambrian Limestone Aquifer. Dissolved methane concentrations are generally too low to enable isotopic characterisation. CSIRO has advised Santos that analysis to determine the stable isotope composition of the methane, which would confirm whether the methane is sourced from microbial activity, cannot be performed with confidence in the results if the dissolved methane concentration is less than 500 µg/L (pers. Comm. Santos, 2022).

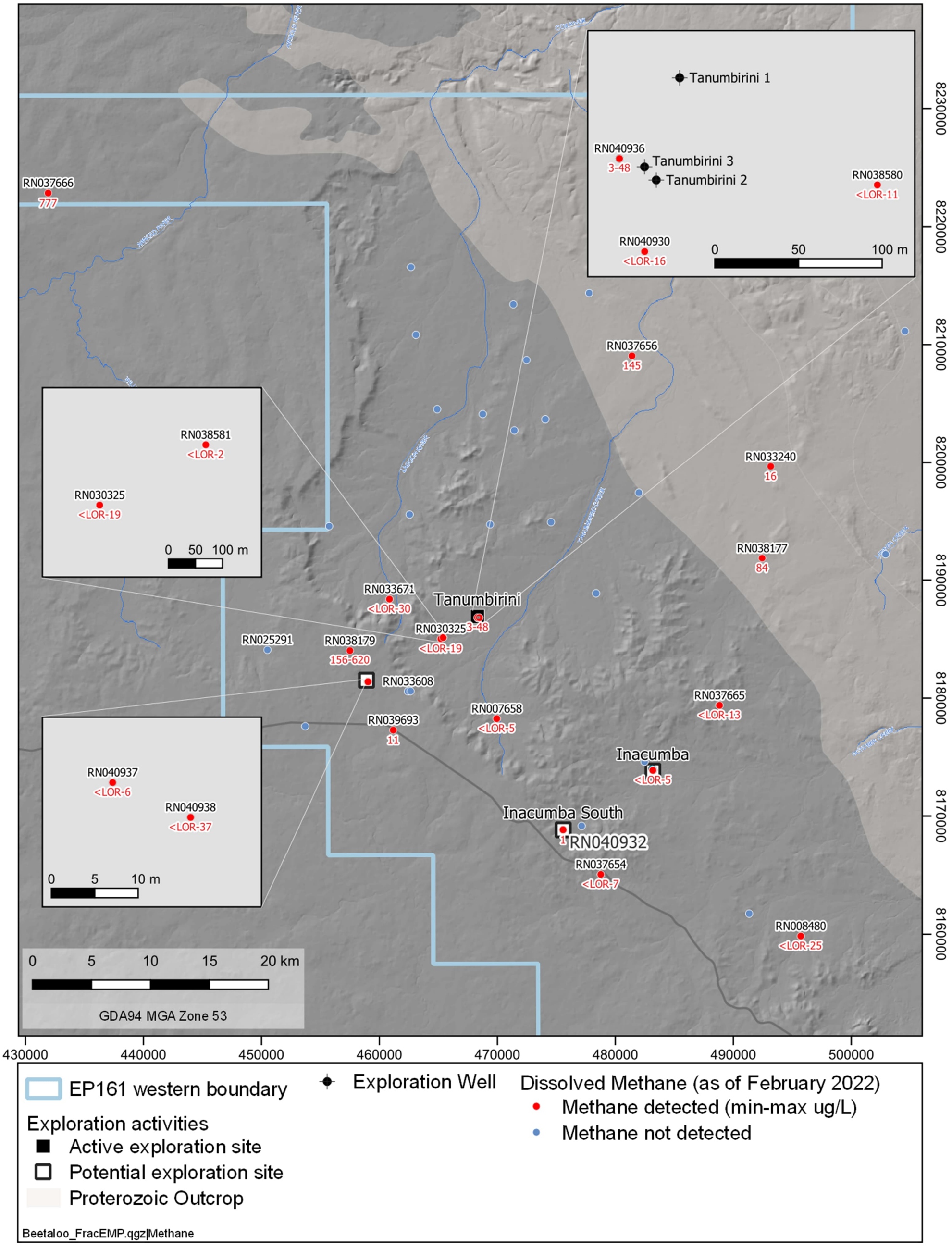
No propane or ethane has been detected in any of the groundwater samples collected by Santos. While the absence of propane and ethane does not preclude a thermogenic origin for the methane, it does indicate that a biogenic source to the methane detected is more likely.

Figure 6 Dissolved methane time series comparison*



* the graphs report the same data at different scales, except for the lowermost graph where some bores have been removed for clarity

Figure 7 Spatial distribution of methane concentrations



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7. Disclaimer

RDM Hydro Pty Ltd (RDM Hydro) has prepared this report with all reasonable skill, care and diligence, and taking account of the timescale and resources allowed to it by agreement with Santos (the Client). Information reported herein is based on the interpretation of data collected and collated, which has been accepted in good faith as being accurate and valid.

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RDM Hydro disclaims any responsibility to the Clients and other parties in respect of any matters outside of the agreed scope of the work.

Attachment A – Groundwater chemistry statistical summaries

RN040930				Statistical Summary - All Data									Pre-Activity Data				Post Activity Data								Statistics	
Group	Parameter	Units	Fraction	Count	Min	Max	Average	P10	P50	P90	First	Last	19-May-20	20-Sep-20	25-Nov-20	16-Mar-21	24-May-21	5-Aug-21	17-Nov-21	1-Feb-22	4-May-22	19-Jul-22	5-Oct-22	13-Feb-23	F.Test Statistic	T.Test - P-value
Field Measurements	pH - Field	pH Unit	N	31	6.28	7.61	6.936	6.56	6.9	7.28	7.1	6.8	7.29	6.67	7.61	7.28	6.92	6.81	6.97	6.89	6.86	6.9	7.02	6.8	0.00	0.10
	Electrical Conductivity - Field	µS/cm	N	31	1183	1643	1384.8	1304	1382	1445	1470	1259	1388	1375	1643	1428	1445	1342	1429	1304	1281	1304	1183	1259	0.38	0.02
	CH4 - Field	% LEL	N	28	<LOR	0.2	0.01	<LOR	<LOR	<LOR	0	0	0	0	0	0.2	0	0	0	0	0	0	0	NA	-	0.10
	Electrical Conductivity @ 25°C	µS/cm	N	35	878	1410	1311.1	1290	1310	1382	1330	1370	1270	1340	1290	1290	1300	1390	1300	1340	1290	1350	1320	1370	0.82	0.06
Physiochemical	Total Dissolved Solids @180°C	mg/L	T	35	616	929	842.7	795.4	848	899.6	824	859	827	848	759	815	859	896	894	872	902	834	910	859	0.38	0.003
	pH - Lab	pH Unit	N	35	7.27	8.04	7.769	7.454	7.78	8.01	7.97	7.9	7.76	7.67	7.9	7.7	7.84	8.03	8.04	7.55	8.01	7.52	7.95	7.9	0.27	0.20
	Suspended Solids	mg/L	N	35	5	46	6.3	5	5	5	<LOR	<LOR	11	5	5	5	5	5	5	5	5	5	5	< 5	-	0.10
Major Ions	Bicarbonate Alkalinity as CaCO3	mg/L	N	35	269	467	403.4	378.2	409	424	417	373	415	384	409	411	401	400	444	422	377	392	382	373	0.41	0.33
	Carbonate Alkalinity as CaCO3	mg/L	N	35	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	1	1	1	1	1	1	1	1	1	1	1	< 1	-	-
	Chloride	mg/L	N	35	60	121	109.8	105.4	111	116	106	115	108	110	113	112	121	116	116	105	121	118	111	115	0.18	0.07
	Sulfate as SO4 2-	mg/L	D	35	125	208	172	161.8	173	183.6	208	172	159	161	180	183	174	182	178	171	174	179	184	172	0.03	0.21
	Sodium	mg/L	D	35	45	83	75.8	74	76	79	78	78	79	77	73	79	79	76	78	77	76	76	83	78	0.62	0.29
	Potassium	mg/L	D	35	7	17	11.9	11	12	13	12	12	11	12	11	12	17	13	14	13	12	13	14	12	0.12	0.02
	Calcium	mg/L	D	35	86	156	136.1	126.4	137	149.6	137	145	134	132	122	141	134	140	137	133	127	86	156	145	0.14	0.50
	Magnesium	mg/L	D	35	35	63	56	53.4	56	60.6	57	56	57	57	51	58	56	56	56	55	55	53	61	56	0.41	0.44
	Fluoride	mg/L	N	35	0.5	1	0.65	0.6	0.6	0.7	1	0.6	0.7	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.78	0.50
Nutrients & Radiological	Nitrite as N	mg/L	N	35	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	< 0.01	-	-
	Nitrate as N	mg/L	N	35	0.04	0.04	0.012	0.01	0.01	0.01	<LOR	<LOR	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	< 0.01	-	-
	Reactive Silica	mg/L	N	34	14.8	25.7	23.41	22.63	23.55	24.91	25.7	23.8	23.4	23.2	24	22.9	25.5	24.6	23.4	24.4	23.8	24.1	24.5	23.8	0.63	0.02
	Gross alpha	Bq/L	N	35	0.43	1.46	0.756	0.594	0.75	0.896	1.46	0.44	0.66	0.86	0.62	0.59	0.79	0.91	0.6	0.79	0.63	0.89	0.9	0.44	0.62	0.27
	Gross beta activity - 40K	Bq/L	N	35	0.12	0.82	0.371	0.232	0.35	0.478	0.82	0.12	0.3	0.38	0.25	0.35	0.37	0.46	0.22	0.26	0.25	0.37	0.43	0.12	0.27	0.44
Dissolved Gases	Methane	µg/L	N	35	1	16	2.1	1	1	4.8	<LOR	3	0.99	1.01	0.99	1.01	0.99	1.01	6	16	9	1	1	3	0.00	0.05
	Ethane	µg/L	N	35	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	1	1	1	1	1	1	1	1	1	1	1	< 1	-	-
	Propane	µg/L	N	35	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	1	1	1	1	1	1	1	1	1	1	1	< 1	-	-
Dissolved Metals/ Metalloids	Aluminium	mg/L	D	35	0.02	0.02	0.01	0.01	0.01	0.01	<LOR	<LOR	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	< 0.01	-	-
	Arsenic	mg/L	D	35	0.001	0.008	0.0043	0.001	0.005	0.007	0.002	<LOR	0.003	0.003	0.002	0.002	0.005	0.002	0.001	0.001	0.001	0.001	0.001	< 0.001	0.15	0.17
	Barium	mg/L	D	35	0.032	0.05	0.0437	0.0414	0.044	0.046	0.039	0.043	0.045	0.043	0.042	0.043	0.044	0.046	0.048	0.046	0.045	0.032	0.044	0.043	0.05	0.45
	Beryllium	mg/L	D	35	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Boron	mg/L	D	35	0.1	0.21	0.172	0.148	0.18	0.19	0.18	0.18	0.14	0.16	0.17	0.17	0.21	0.19	0.18	0.2	0.18	0.17	0.16	0.18	0.92	0.02
	Cadmium	mg/L	D	35	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0002	<LOR	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	< 0.0001	-	0.05
	Chromium	mg/L	D	35	0.009	0.009	0.0012	0.001	0.001	0.001	<LOR	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Cobalt	mg/L	D	35	0.001	0.057	0.0053	0.001	0.004	0.0076	0.057	<LOR	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	0.001
	Copper	mg/L	D	35	0.001	0.014	0.0015	0.001	0.001	0.001	<LOR	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.001	0.014	0.001	0.001	< 0.001	-	0.18
	Iron	mg/L	D	35	0.06	1.11	0.393	0.054	0.39	0.672	<LOR	0.64	0.41	0.8	1.11	0.39	0.54	0.39	0.56	0.47	0.66	0.05	0.49	0.64	0.19	0.11
	Lead	mg/L	D	35	0.001	0.003	0.0011	0.001	0.001	0.001	<LOR	<LOR	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	0.10
	Lithium	mg/L	D	35	0.057	0.076	0.0667	0.0624	0.066	0.0726	0.069	0.068	0.065	0.064	0.065	0.068	0.059	0.068	0.066	0.07	0.068	0.064	0.071	0.068	0.22	0.28
	Manganese	mg/L	D	35	0.001	0.046	0.0185	0.015	0.018	0.0236	0.026	0.019	0.02	0.014	0.016	0.02	0.017	0.019	0.018	0.018	0.019	0.001	0.018	0.019	0.27	0.34
	Mercury	mg/L	D	35	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	< 0.0001	-	0.05
	Molybdenum	mg/L	D	35	0.001	0.009	0.0013	0.001	0.001	0.001	0.003	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Nickel	mg/L	D	35	0.001	0.22	0.0193	0.002	0.012	0.0252	0.22	0.004	0.007	0.006	0.007	0.004	0.003	0.005	0.002	0.001	0.002	0.001	0.001	0.004	0.99	0.001
	Selenium	mg/L	D	35	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	< 0.01	-	-
	Silver	mg/L	D	34	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Strontium	mg/L	D	34	0.692	0.864	0.7874	0.7479	0.785	0.84	0.719	0.781	0.84	0.772	0.734	0.75	0.753	0.747	0.804	0.858	0.764	0.692	0.788	0.781	0.94	0.49
	Uranium	mg/L	D	35	0.001	0.037	0.0055	0.0014	0.005	0.008	0.037	0.001	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.78	0.01
	Vanadium	mg/L	D	35	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	< 0.01	-	-
	Zinc	mg/L	D	35	0.005	0.099	0.0245	0.0064	0.02	0.0438	0.099	0.014	0.005	0.025	0.015	0.007	0.035	0.033	0.012	0.006	0.018	0.005	0.016	0.014	0.79	0.26
Total Metals/ Metalloids	Aluminium	mg/L	T	35	0.02	0.03	0.011	0.01	0.01	0.01	<LOR	<LOR	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	< 0.01	-	0.24
	Arsenic	mg/L	T	35	0.001	0.014	0.0047	0.001	0.005	0.0076	0.002	<LOR	0.004	0.003	0.002	0.003	0.005	0.004	0.001	0.001	0.001	0.002	0.001	< 0.001	0.27	0.18
	Barium	mg/L	T	35	0.038	0.053	0.0467	0.0434	0.047	0.05	0.04	0.046	0.047	0.045	0.038	0.05	0.044	0.051	0.046	0.047	0.048	0.048	0.049	0.046	0.05	0.13
	Beryllium	mg/L	T	35	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Boron	mg/L	T	35	0.08	0.27	0.177	0.14	0.18	0.21	0.16	0.18	0.22	0.16	0.17	0.18	0.17	0.27	0.16	0.2	0.24	0.18	0.14	0.18	0.45	0.34
	Cadmium	mg/L	T	35	0.0001	0.0002	0.00011	0.0001	0.0001	0.0001	0.0002	<LOR	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	< 0.0001	-	0.05
	Chromium	mg/L	T	35	0.001	0.003	0.0012	0.001	0.001	0.0016	<LOR	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Cobalt	mg/L	T	35	0.002	0.06	0.0058	0.001	0.004	0.0086	0.06	<LOR	0.004	0.002	0.002	0.003	0.001	0.003	0.001	0.001	0.001	0.001	0.001	< 0.001	0.57	0.01
	Copper	mg/L	T	35	0.002	0.158	0.0121	0.001	0.006	0.0176	<LOR	<LOR	0.007	0.004	0.001	0.031	0.017	0.018	0.005	0.014	0.001	0.158	0.043	< 0.001	0.04	0.14
	Iron	mg/L	T	35	0.21	3.62	1.06	0.296	0.7	2.356	0.23	0.7	3.3	1.69	1.06	1.9	0.75	2.29	0.55	0.61	0.6	1.07	0.83	0.7	0.25	0.02
	Lead	mg/L	T	35	0.001	0.028	0.0052	0.001	0.004	0.009	0.001	<LOR	0.005	0.002	0.002	0.004	0.002	0.005	0.001	0.001	0.001	0.004	0.002	< 0.001	0.99	0.18
	Lithium	mg/L	T	35	0.057	0.082	0.0689	0.0614	0.069	0.0766	0.062	0.07	0.077	0.069	0.06	0.071	0.067	0.072	0.061	0.071	0.075	0.068	0.064	0.07	0.30	0.41
	Manganese	mg/L	T	35	0.008	0.057	0.0207	0.016	0.018	0.0282	0.029	0.019	0.023	0.016	0.015	0.022	0.017	0.027	0.016	0.018	0.018	0.021	0.017	0.019	0.67	0.48
	Mercury	mg/L	T	35	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	< 0.0001	-	0.05
	Molybdenum	mg/L	T	35	0.001	0.004	0.0011	0.001	0.001	0.001	0.003	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Nickel	mg/L	T	35	0.001	0.234	0.0207	0.003	0.014	0.028	0.234	0.004	0.012	0.008	0.006	0.005	0.004	0.014	0.001	0.003	0.001	0.003	0.002	0.004	0.66	0.07
	Selenium	mg/L	T	35	0.05	0.05	0.011	0.01	0.01	0.01	<LOR	<LOR	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	< 0.01	-	-
	Silver	mg/L	T	34	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Strontium	mg/L	T	34	0.668	0.944	0.8156	0.7507	0.8255	0.8694	0.7	0.797	0.86	0.859	0.668	0.792	0.776	0.819	0.765	0.861	0.797	0.802	0.878	0.797	0.07	0.32
	Uranium	mg/L	T	35	0.001	0.038	0.0059	0.002	0.005	0.009	0.038	0.001	0.004	0.003	0.003	0.003	0.002	0.003	0.002	0.002	0.001	0.002	0.001	0.001	0.61	0.002
	Vanadium	mg/L	T	35	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	< 0.01	-	-
	Zinc	mg/L	T	35	0.006	0.101	0.043	0.014	0.039	0.0686	0.101	0.014	0.034	0.038	0.014	0.045	0.054	0.062	0.01	0.016	0.006	0.063	0.046	0.014	0.34	0.47
Complex Hydrocarbons	C6 - C36 Fraction (Sum)	µg/L	N	30	1360	1360	64.7	20	20	20	<LOR	<LOR	20	20	1360	20	20	20	20	20	20	20	20	< 20	-	0.10
	Sum of BTEX	µg/L	N	35	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	1	1	1	1	1	1	1	1	1	1	1	< 1	-	-
	Sum of polycyclic aromatic hydrocarbons (PAHs)	µg/L	N	33	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	< 0.1	-	0.05

NA = not analysed

RN040936				Statistical Summary - All Data									Pre-Activity Data			Post Activity Data							Statistics	
Group	Parameter	Units	Fraction	Count	Min	Max	Average	P10	P50	P90	First	Last	18-Sep-20	25-Nov-20	16-Mar-21	17-Nov-21	1-Feb-22	1-Feb-22	5-May-22	20-Jul-22	5-Oct-22	11-Jan-23	F-Test Statistic	T-Test - P-value
Field Measurements	pH - Field	pH Unit	N	16	6.44	7.13	6.735	6.52	6.725	6.93	6.55	6.49	6.66	7.01	6.81	6.72	6.82	6.82	6.85	6.62	6.69	6.49	0.48	0.15
	Electrical Conductivity - Field	µS/cm	N	16	1117	1691	1361.8	1225.5	1377.5	1433.5	1395	1117	1412	1691	1342	1393	1312	1312	1250	1296	1201	1117	0.14	0.02
	CH4 - Field	% LEL	N	16	<LOR	0.2	0.02	<LOR	<LOR	0.05	0	0	0	0	0.2	0	0	0	0	0	0	0	-	0.07
	Electrical Conductivity @ 25°C	µS/cm	N	17	1280	1360	1323.5	1300	1320	1350	1320	1310	1340	1300	1300	1360	1350	1340	1320	1350	1320	1310	0.60	0.07
Physiochemical	Total Dissolved Solids @180°C	mg/L	T	17	783	920	863.9	827.8	869	901.6	853	916	853	783	829	920	848	880	883	826	892	916	0.79	0.02
	pH - Lab	pH Unit	N	17	7.28	8.05	7.529	7.304	7.46	7.93	7.46	7.77	7.37	7.43	7.39	8.05	7.34	7.28	7.89	7.33	7.56	7.77	0.02	0.06
	Suspended Solids	mg/L	N	17	6	18	7.7	5	7	9.4	6	<LOR	6	9	8	5	8	10	7	8	5	< 5	0.85	0.36
Major Ions	Bicarbonate Alkalinity as CaCO3	mg/L	N	17	377	435	400.7	380.2	397	421.8	416	386	384	409	408	435	423	421	381	389	377	386	0.57	0.46
	Carbonate Alkalinity as CaCO3	mg/L	N	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	1	1	1	1	1	1	1	1	1	< 1	-	-
	Chloride	mg/L	N	17	103	125	111.8	105.8	111	119.2	111	118	112	114	113	118	107	108	125	121	109	118	0.04	0.23
	Sulfate as SO4 2-	mg/L	D	17	156	187	175.4	164.4	178	185.4	187	183	166	179	182	174	170	168	179	178	180	183	0.35	0.47
	Sodium	mg/L	D	17	76	83	78.8	76	79	81	80	81	77	76	77	78	77	76	76	80	83	81	0.09	0.12
	Potassium	mg/L	D	17	11	15	13	12	13	15	12	13	12	11	12	15	14	15	14	14	15	13	0.83	0.0004
	Calcium	mg/L	D	17	124	155	138.4	128.6	137	152.8	151	134	130	128	138	138	130	129	124	132	154	134	0.50	0.35
	Magnesium	mg/L	D	17	54	60	56.4	54	57	58.4	57	54	57	54	56	55	55	54	54	56	60	54	0.75	0.43
	Fluoride	mg/L	N	17	0.6	0.7	0.61	0.6	0.6	0.64	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	-	-
Nutrients & Radiological	Nitrite as N	mg/L	N	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	< 0.01	-	-
	Nitrate as N	mg/L	N	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	< 0.01	-	-
	Reactive Silica	mg/L	N	17	21.8	25.1	23.69	22.16	24.2	24.78	22.2	24.3	22.1	23.3	22.9	24.2	24.4	24.7	24.3	24.7	25.1	24.3	0.18	0.0001
	Gross alpha	Bq/L	N	17	0.54	0.93	0.721	0.564	0.73	0.85	0.79	0.66	0.82	0.76	0.58	0.66	0.73	0.83	0.63	0.93	0.88	0.66	0.79	0.32
	Gross beta activity - 40K	Bq/L	N	17	0.2	0.44	0.328	0.252	0.34	0.384	0.36	0.36	0.39	0.31	0.37	0.24	0.38	0.36	0.31	0.44	0.34	0.36	0.69	0.41
Dissolved Gases	Methane	µg/L	N	17	3	48	14.2	3	8	32.2	3	15	8	9	8	29	48	37	26	19	16	15	0.00	0.003
	Ethane	µg/L	N	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	1	1	1	1	1	1	1	1	1	< 1	-	-
	Propane	µg/L	N	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	1	1	1	1	1	1	1	1	1	< 1	-	-
Dissolved Metals/ Metalloids	Aluminium	mg/L	D	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	< 0.01	-	-
	Arsenic	mg/L	D	17	0.001	0.004	0.002	0.001	0.002	0.0034	0.004	<LOR	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Barium	mg/L	D	17	0.039	0.051	0.0453	0.0418	0.045	0.0494	0.045	0.047	0.043	0.043	0.044	0.051	0.048	0.047	0.04	0.049	0.046	0.047	0.06	0.06
	Beryllium	mg/L	D	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Boron	mg/L	D	17	0.12	0.2	0.169	0.136	0.18	0.19	0.19	0.18	0.16	0.18	0.17	0.18	0.19	0.2	0.18	0.18	0.16	0.18	0.91	0.10
	Cadmium	mg/L	D	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	< 0.0001	-	-
	Chromium	mg/L	D	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Cobalt	mg/L	D	17	0.001	0.002	0.0013	0.001	0.001	0.002	0.002	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Copper	mg/L	D	17	0.001	0.001	0.001	0.001	0.001	0.001	<LOR	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Iron	mg/L	D	17	1.82	4.73	2.478	1.112	2.43	3.816	3.68	1.82	2.16	3.1	2.37	2.51	2.43	2.17	0.05	1.97	1.95	1.82	0.57	0.11
	Lead	mg/L	D	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Lithium	mg/L	D	17	0.055	0.074	0.0677	0.0632	0.069	0.071	0.07	0.066	0.068	0.071	0.067	0.067	0.07	0.07	0.069	0.071	0.07	0.066	0.68	0.40
	Manganese	mg/L	D	17	0.023	0.062	0.0375	0.0292	0.036	0.0464	0.05	0.03	0.023	0.036	0.031	0.038	0.039	0.034	0.032	0.034	0.035	0.03	0.14	0.08
	Mercury	mg/L	D	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	< 0.0001	-	-
	Molybdenum	mg/L	D	17	0.001	0.001	0.001	0.001	0.001	0.001	<LOR	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Nickel	mg/L	D	17	0.001	0.009	0.0036	0.001	0.003	0.0074	0.009	<LOR	0.003	0.004	0.002	0.001	0.002	0.001	0.001	0.001	0.001	< 0.001	0.09	0.002
	Selenium	mg/L	D	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	< 0.01	-	-
	Silver	mg/L	D	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Strontium	mg/L	D	17	0.722	0.86	0.7992	0.7544	0.798	0.8456	0.794	0.827	0.752	0.758	0.722	0.804	0.817	0.833	0.756	0.84	0.775	0.827	0.60	0.01
	Uranium	mg/L	D	17	0.001	0.005	0.0029	0.001	0.003	0.0044	0.005	0.001	0.003	0.004	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.75	0.0005
	Vanadium	mg/L	D	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	< 0.01	-	-
	Zinc	mg/L	D	17	0.006	0.024	0.0138	0.0082	0.012	0.0198	0.006	0.019	0.024	0.021	0.015	0.018	0.018	0.012	0.007	0.016	0.012	0.019	0.79	0.06
Total Metals/ Metalloids	Aluminium	mg/L	T	17	0.01	0.02	0.011	0.01	0.01	0.01	<LOR	<LOR	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	< 0.01	-	0.26
	Arsenic	mg/L	T	17	0.001	0.004	0.0021	0.001	0.002	0.0034	0.004	<LOR	0.002	0.003	0.002	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	0.0002
	Barium	mg/L	T	17	0.039	0.086	0.0505	0.0426	0.049	0.0572	0.043	0.052	0.044	0.039	0.049	0.05	0.086	0.055	0.059	0.056	0.054	0.052	0.30	0.04
	Beryllium	mg/L	T	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Boron	mg/L	T	17	0.08	0.28	0.168	0.126	0.17	0.214	0.17	0.21	0.14	0.16	0.2	0.17	0.14	0.16	0.22	0.28	0.17	0.21	0.64	0.21
	Cadmium	mg/L	T	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	< 0.0001	-	-
	Chromium	mg/L	T	17	0.002	0.002	0.0011	0.001	0.001	0.001	<LOR	<LOR	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	< 0.001	-	0.26
	Cobalt	mg/L	T	17	0.002	0.002	0.0016	0.001	0.002	0.002	0.002	<LOR	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Copper	mg/L	T	17	0.001	0.01	0.0029	0.001	0.002	0.0054	0.004	0.006	0.001	0.001	0.001	0.004	0.001	0.003	0.001	0.003	0.002	0.006	-	0.06
	Iron	mg/L	T	17	2.18	6.19	3.669	2.306	3.58	5.3	4.12	2.18	2.27	4.69	3.58	2.5	2.97	2.36	2.37	2.89	2.33	2.18	0.01	0.14
	Lead	mg/L	T	17	0.001	0.005	0.0017	0.001	0.001	0.0028	0.004	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	-	0.27
	Lithium	mg/L	T	17	0.058	0.076	0.068	0.0616	0.069	0.075	0.069	0.075	0.065	0.058	0.074	0.066	0.071	0.061	0.071	0.07	0.07	0.075	0.22	0.20
	Manganese	mg/L	T	17	0.025	0.062	0.0378	0.0316	0.035	0.0478	0.052	0.033	0.025	0.033	0.032	0.035	0.037	0.035	0.037	0.034	0.032	0.033	0.09	0.02
	Mercury	mg/L	T	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	< 0.0001	-	-
	Molybdenum	mg/L	T	17	0.001	0.003	0.0011	0.001	0.001	0.001	<LOR	<LOR	0.001	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.001	< 0.001	-	0.26
	Nickel	mg/L	T	17	0.001	0.011	0.0049	0.001	0.005	0.0094	0.009	0.001	0.006	0.007	0.002	0.01	0.002	0.001	0.001	0.001	0.001	0.001	0.86	0.14
	Selenium	mg/L	T	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	< 0.01	-	-
	Silver	mg/L	T	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	< 0.001	-	-
	Strontium	mg/L	T	17	0.702	0.88	0.8123	0.7636	0.803	0.8772	0.763	0.88	0.876	0.702	0.769	0.77	0.791	0.87	0.794	0.837	0.879	0.88	0.19	0.13
	Uranium	mg/L	T	17	0.001	0.005	0.0031	0.001	0.004	0.005	0.005	0.001	0.003	0.004	0.004	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.75	0.0002
	Vanadium	mg/L	T	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	< 0.01	-	-
	Zinc	mg/L	T	17	0.013	0.041	0.0213	0.015	0.021	0.026	0.015	0.026	0.02	0.02	0.021	0.02	0.022	0.015	0.015	0.026	0.016	0.026	0.03	0.43
Complex Hydrocarbons	C6 - C36 Fraction (Sum)	µg/L	N	16	80	140	48.1	20	20	120	<LOR	<LOR	20	20	20	20	20	20	20	20	20	< 20	-	-
	Sum of BTEX	µg/L	N	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	1	1	1	1	1	1	1	1	1	< 1	-	-
	Sum of polycyclic aromatic hydrocarbons (PAHs)	µg/L	N	17	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	< 0.1	-	-

RN040931													
Group	**Parameter**	**Units**	**Fraction**	**Count**	**Min**	**Max**	**Average**	**P10**	**P50**	**P90**	**First**	**Last**	**MK-trend**
Field Measurements	pH - Field	pH Unit	N	25	6.39	8.11	7.356	6.77	7.3	8.008	7.8	7.78	Rising
	Electrical Conductivity - Field	µS/cm	N	25	1241	2018	1662.5	1319	1794	1925.4	1845	1290	Falling
	CH4 - Field	% LEL	N	24	<LOR	0.2	0.01	<LOR	<LOR	<LOR	0	0	No Trend
	Electrical Conductivity @ 25°C	µS/cm	N	27	1200	1940	1583.3	1260	1590	1894	1560	1280	Falling
	Total Dissolved Solids @180°C	mg/L	T	27	697	1330	1016.4	732.2	1130	1258	976	783	Falling
Physiochemical parameters	pH - Lab	pH Unit	N	27	7.36	8.49	7.947	7.454	8	8.354	8.06	8.29	Rising
	Suspended Solids	mg/L	N	27	8	36	14.6	5	13	30.4	35	<LOR	Falling
Major ions, nutrients and radiological parameters	Bicarbonate Alkalinity as CaCO3	mg/L	N	27	225	470	362.2	244.4	366	461.8	363	271	Falling
	Carbonate Alkalinity as CaCO3	mg/L	N	27	7	22	3.3	1	1	10.6	<LOR	<LOR	Rising
	Chloride	mg/L	N	27	142	161	153.1	147.2	154	159	148	142	No Trend
	Sulfate as SO4 2-	mg/L	D	27	192	451	313.1	195	343	423	328	203	Falling
	Sodium	mg/L	D	27	100	127	110.1	105.4	109	117.4	103	117	No Trend
	Potassium	mg/L	D	27	22	33	27.6	26	28	30	22	28	No Trend
	Calcium	mg/L	D	27	20	163	92	21.6	114	156.6	134	28	Falling
	Magnesium	mg/L	D	27	80	122	98.6	83.6	102	114.4	88	95	Falling
	Fluoride	mg/L	N	27	1.3	3	2.15	1.5	2.3	2.8	1.8	1.5	Falling
	Nitrite as N	mg/L	N	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Nitrate as N	mg/L	N	27	0.02	2.12	0.091	0.01	0.01	0.014	0.02	<LOR	No Trend
	Reactive Silica	mg/L	N	26	7.42	24.8	16.492	7.88	17.75	24.55	23.9	9.37	Falling
	Gross alpha	Bq/L	N	27	0.05	1.7	0.28	0.114	0.24	0.354	1.7	0.09	Falling
	Gross beta activity - 40K	Bq/L	N	27	0.1	0.84	0.223	0.106	0.21	0.28	0.84	<LOR	Falling
Dissolved Gases	Methane	µg/L	N	27	2	5	1.5	1	1	1.4	<LOR	<LOR	Rising
	Ethane	µg/L	N	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Propane	µg/L	N	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
Dissolved Metals/Metalloids	Aluminium	mg/L	D	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Arsenic	mg/L	D	27	0.001	0.003	0.0012	0.001	0.001	0.002	0.003	<LOR	Falling
	Barium	mg/L	D	27	0.019	0.047	0.0293	0.0206	0.029	0.036	0.028	0.021	Falling
	Beryllium	mg/L	D	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Boron	mg/L	D	27	0.1	0.31	0.244	0.208	0.25	0.28	0.31	0.25	No Trend
	Cadmium	mg/L	D	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Chromium	mg/L	D	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Cobalt	mg/L	D	27	0.033	0.033	0.0022	0.001	0.001	0.001	0.033	<LOR	No Trend
	Copper	mg/L	D	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Iron	mg/L	D	27	0.07	9.58	1.878	0.05	0.29	5.77	<LOR	<LOR	Falling
	Lead	mg/L	D	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Lithium	mg/L	D	27	0.19	0.51	0.4224	0.3796	0.434	0.482	0.416	0.48	Rising
	Manganese	mg/L	D	27	0.068	0.249	0.1407	0.0696	0.125	0.2284	0.142	<LOR	Falling
	Mercury	mg/L	D	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Molybdenum	mg/L	D	27	0.001	0.046	0.0037	0.001	0.002	0.0034	0.046	0.002	No Trend
	Nickel	mg/L	D	27	0.001	0.032	0.0021	0.001	0.001	0.001	0.032	<LOR	No Trend
	Selenium	mg/L	D	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Silver	mg/L	D	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Strontium	mg/L	D	27	0.096	1.02	0.5809	0.117	0.671	0.9864	0.868	0.145	Falling
	Uranium	mg/L	D	27	0.01	0.01	0.0013	0.001	0.001	0.001	0.01	<LOR	No Trend
	Vanadium	mg/L	D	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Zinc	mg/L	D	27	0.012	0.098	0.0212	0.005	0.012	0.0482	0.014	0.023	Falling
Total Metals/Metalloids	Aluminium	mg/L	T	27	0.01	0.3	0.023	0.01	0.01	0.02	0.3	<LOR	Falling
	Arsenic	mg/L	T	27	0.001	0.01	0.0019	0.001	0.002	0.002	0.01	<LOR	Falling
	Barium	mg/L	T	27	0.025	0.048	0.034	0.026	0.034	0.0416	0.036	0.026	Falling
	Beryllium	mg/L	T	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Boron	mg/L	T	27	0.06	0.36	0.261	0.224	0.26	0.316	0.27	0.26	No Trend
	Cadmium	mg/L	T	27	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	<LOR	0.0001	No Trend
	Chromium	mg/L	T	27	0.003	0.003	0.0011	0.001	0.001	0.001	<LOR	<LOR	No Trend
	Cobalt	mg/L	T	27	0.036	0.036	0.0023	0.001	0.001	0.001	0.036	<LOR	No Trend
	Copper	mg/L	T	27	0.001	0.002	0.001	0.001	0.001	0.001	0.002	<LOR	No Trend
	Iron	mg/L	T	27	0.05	19.1	6.776	0.872	5.03	14.96	7.33	0.12	Falling
	Lead	mg/L	T	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Lithium	mg/L	T	27	0.199	0.606	0.4475	0.4016	0.45	0.5038	0.365	0.49	No Trend
	Manganese	mg/L	T	27	0.002	0.269	0.159	0.0778	0.163	0.2418	0.163	0.002	Falling
	Mercury	mg/L	T	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Molybdenum	mg/L	T	27	0.002	0.05	0.0041	0.002	0.002	0.003	0.05	0.003	Rising
	Nickel	mg/L	T	27	0.001	0.034	0.0024	0.001	0.001	0.0014	0.034	<LOR	No Trend
	Selenium	mg/L	T	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Silver	mg/L	T	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Strontium	mg/L	T	27	0.082	1.16	0.6234	0.1222	0.835	1.03	0.835	0.164	Falling
	Uranium	mg/L	T	27	0.011	0.011	0.0014	0.001	0.001	0.001	0.011	<LOR	No Trend
	Vanadium	mg/L	T	27	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Zinc	mg/L	T	27	0.021	0.473	0.078	0.0298	0.048	0.1042	0.041	0.045	No Trend
Complex Hydrocarbons	C6 - C36 Fraction (Sum)	µg/L	N	23	50	120	30	20	20	44	<LOR	120	No Trend
	Sum of BTEX	µg/L	N	27	2	2	1	1	1	1	<LOR	<LOR	No Trend
	Sum of polycyclic aromatic hydrocarbons (PAHs)	µg/L	N	26	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA

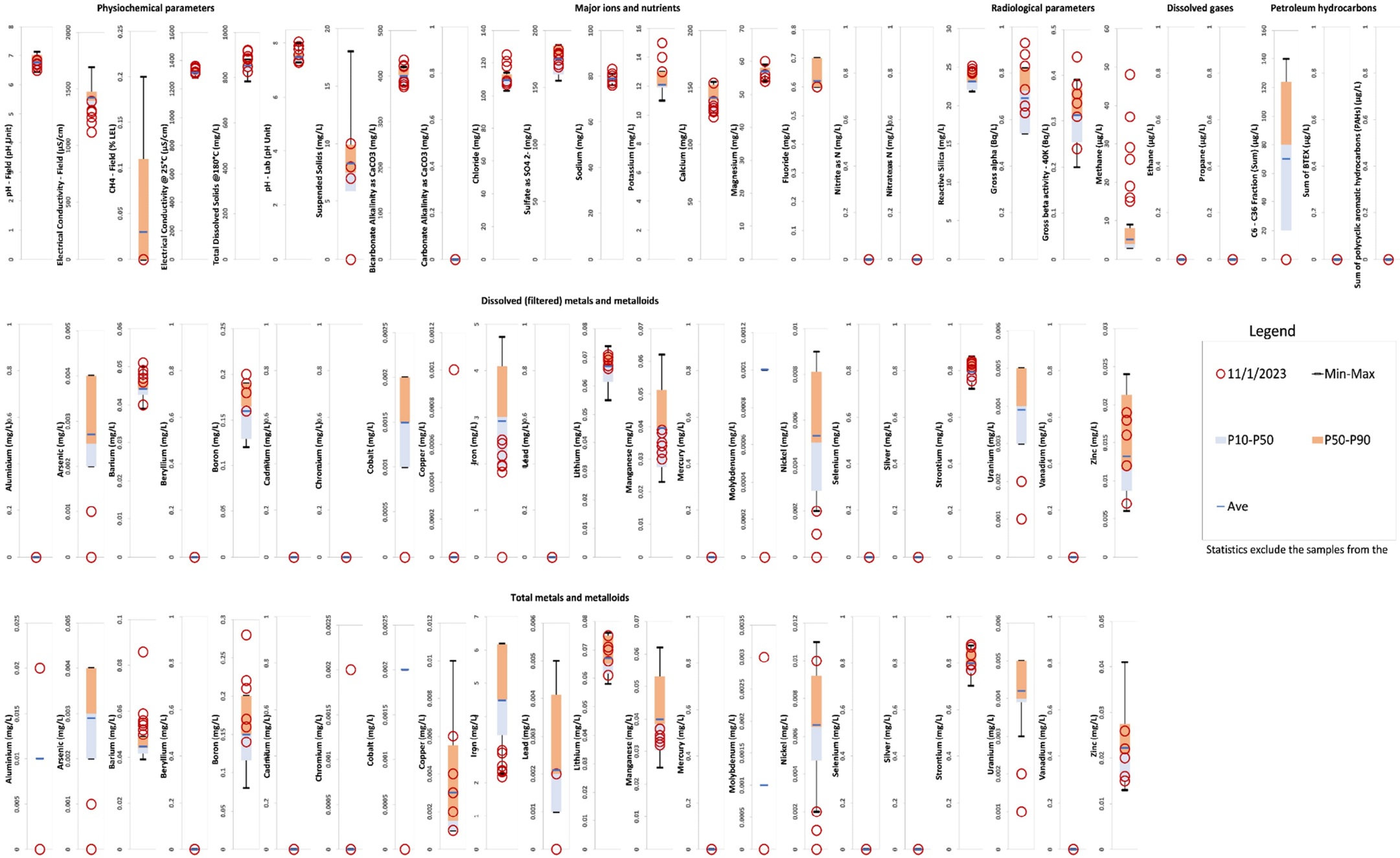
RN041242													
Group	**Parameter**	**Units**	**Fraction**	**Count**	**Min**	**Max**	**Average**	**P10**	**P50**	**P90**	**First**	**Last**	**MK-trend**
Field Measurements	pH - Field	pH Unit	N	11	6.69	7.25	6.907	6.7	6.89	7.13	7.13	7.25	No Trend
	Electrical Conductivity - Field	µS/cm	N	11	733	1841	1442.9	1340	1480	1579	1579	1340	Falling
	CH4 - Field	% LEL	N	10	<LOR	0.2	0.02	<LOR	<LOR	0.02	0.2	0	No Trend
	Electrical Conductivity @ 25°C	µS/cm	N	11	1360	1510	1431.8	1390	1430	1480	1410	1440	No Trend
	Total Dissolved Solids @180°C	mg/L	T	11	854	1030	980.6	966	990	1030	991	1030	No Trend
Physiochemical parameters	pH - Lab	pH Unit	N	11	7.41	8	7.682	7.48	7.61	7.9	7.57	7.84	No Trend
	Suspended Solids	mg/L	N	11	6	32	7.5	5	5	6	<LOR	<LOR	No Trend
Major ions, nutrients and radiological parameters	Bicarbonate Alkalinity as CaCO3	mg/L	N	11	355	438	389.9	372	386	406	355	375	No Trend
	Carbonate Alkalinity as CaCO3	mg/L	N	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Chloride	mg/L	N	11	103	114	106.2	103	106	108	103	103	No Trend
	Sulfate as SO4 2-	mg/L	D	11	242	287	268.5	258	265	284	258	278	No Trend
	Sodium	mg/L	D	11	67	74	71.1	69	72	72	67	74	No Trend
	Potassium	mg/L	D	11	12	14	12.5	12	12	13	13	14	No Trend
	Calcium	mg/L	D	11	143	179	158.9	147	157	174	147	179	No Trend
	Magnesium	mg/L	D	11	60	69	64.4	62	64	66	60	69	No Trend
	Fluoride	mg/L	N	10	0.6	0.8	0.68	0.6	0.7	0.8	0.8	0.6	Falling
	Nitrite as N	mg/L	N	10	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Nitrate as N	mg/L	N	10	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Reactive Silica	mg/L	N	10	21.7	23.6	22.54	22.06	22.6	22.88	22.3	23.6	No Trend
	Gross alpha	Bq/L	N	11	0.71	1.26	0.959	0.78	0.87	1.21	0.71	1.26	Rising
	Gross beta activity - 40K	Bq/L	N	11	0.27	1	0.452	0.28	0.37	0.61	0.37	0.61	No Trend
Dissolved Gases	Methane	µg/L	N	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Ethane	µg/L	N	10	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Propane	µg/L	N	10	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
Dissolved Metals/Metalloids	Aluminium	mg/L	D	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Arsenic	mg/L	D	11	0.001	0.002	0.0011	0.001	0.001	0.001	0.001	<LOR	No Trend
	Barium	mg/L	D	11	0.03	0.038	0.0355	0.034	0.036	0.037	0.035	0.035	No Trend
	Beryllium	mg/L	D	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Boron	mg/L	D	11	0.12	0.18	0.159	0.13	0.17	0.18	0.17	0.12	No Trend
	Cadmium	mg/L	D	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Chromium	mg/L	D	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Cobalt	mg/L	D	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Copper	mg/L	D	11	0.013	0.013	0.0021	0.001	0.001	0.001	<LOR	<LOR	No Trend
	Iron	mg/L	D	11	0.14	0.5	0.292	0.14	0.32	0.38	0.14	0.35	Rising
	Lead	mg/L	D	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Lithium	mg/L	D	11	0.08	0.116	0.0906	0.082	0.09	0.095	0.116	0.082	Falling
	Manganese	mg/L	D	11	0.004	0.019	0.0089	0.004	0.008	0.013	0.004	0.01	Rising
	Mercury	mg/L	D	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Molybdenum	mg/L	D	10	0.001	0.006	0.0016	0.001	0.001	0.0024	0.006	<LOR	No Trend
	Nickel	mg/L	D	11	0.001	0.006	0.0016	0.001	0.001	0.003	0.001	<LOR	No Trend
	Selenium	mg/L	D	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Silver	mg/L	D	10	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Strontium	mg/L	D	10	0.727	0.87	0.7843	0.7432	0.778	0.8358	0.87	0.782	No Trend
	Uranium	mg/L	D	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Vanadium	mg/L	D	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Zinc	mg/L	D	11	0.01	0.099	0.0317	0.01	0.028	0.05	0.028	0.028	No Trend
Total Metals/Metalloids	Aluminium	mg/L	T	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Arsenic	mg/L	T	11	0.001	0.002	0.0011	0.001	0.001	0.001	0.001	<LOR	No Trend
	Barium	mg/L	T	11	0.02	0.044	0.0361	0.032	0.038	0.039	0.038	0.044	No Trend
	Beryllium	mg/L	T	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Boron	mg/L	T	11	0.08	0.3	0.175	0.13	0.17	0.23	0.17	0.13	No Trend
	Cadmium	mg/L	T	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Chromium	mg/L	T	11	0.001	0.002	0.0012	0.001	0.001	0.002	<LOR	<LOR	No Trend
	Cobalt	mg/L	T	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Copper	mg/L	T	11	0.001	0.01	0.0035	0.001	0.002	0.007	0.004	0.002	No Trend
	Iron	mg/L	T	11	0.17	0.7	0.391	0.25	0.4	0.56	0.17	0.56	Rising
	Lead	mg/L	T	11	0.001	0.002	0.0011	0.001	0.001	0.001	0.002	<LOR	No Trend
	Lithium	mg/L	T	11	0.034	0.121	0.0884	0.078	0.092	0.102	0.121	0.079	Falling
	Manganese	mg/L	T	11	0.003	0.02	0.0091	0.004	0.008	0.014	0.004	0.011	Rising
	Mercury	mg/L	T	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Molybdenum	mg/L	T	11	0.005	0.005	0.0017	0.001	0.001	0.005	0.005	<LOR	Falling
	Nickel	mg/L	T	11	0.001	0.01	0.0018	0.001	0.001	0.001	<LOR	0.001	No Trend
	Selenium	mg/L	T	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Silver	mg/L	T	10	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Strontium	mg/L	T	10	0.394	0.896	0.7704	0.646	0.825	0.8636	0.843	0.896	No Trend
	Uranium	mg/L	T	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Vanadium	mg/L	T	11	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Zinc	mg/L	T	11	0.009	0.078	0.0288	0.018	0.022	0.053	0.021	0.02	No Trend
Complex Hydrocarbons	C6 - C36 Fraction (Sum)	µg/L	N	10	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Sum of BTEX	µg/L	N	10	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA
	Sum of polycyclic aromatic hydrocarbons (PAHs)	µg/L	N	10	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	NA

Attachment B – Box-and-whisker plots

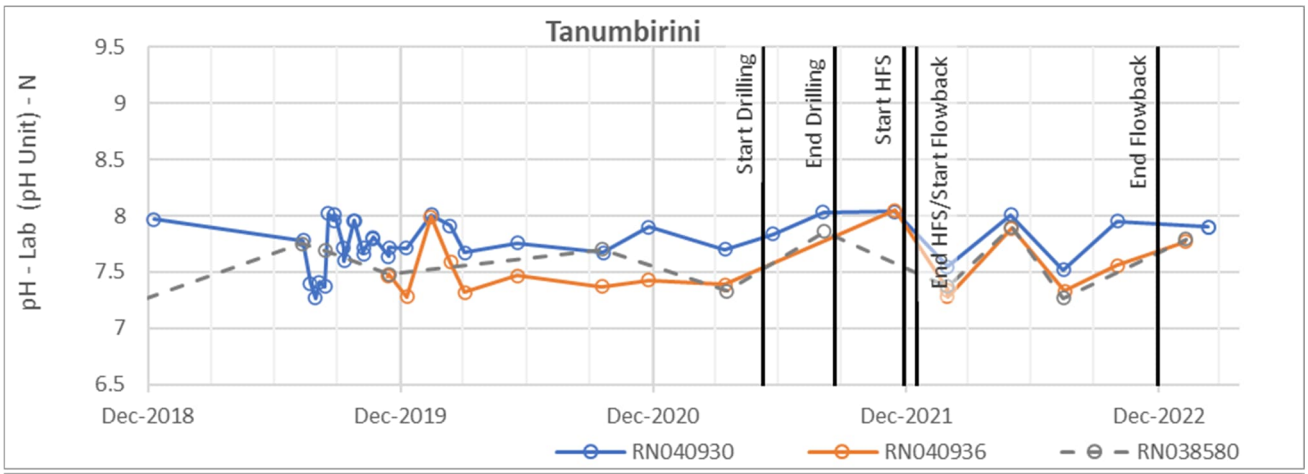
RN040930

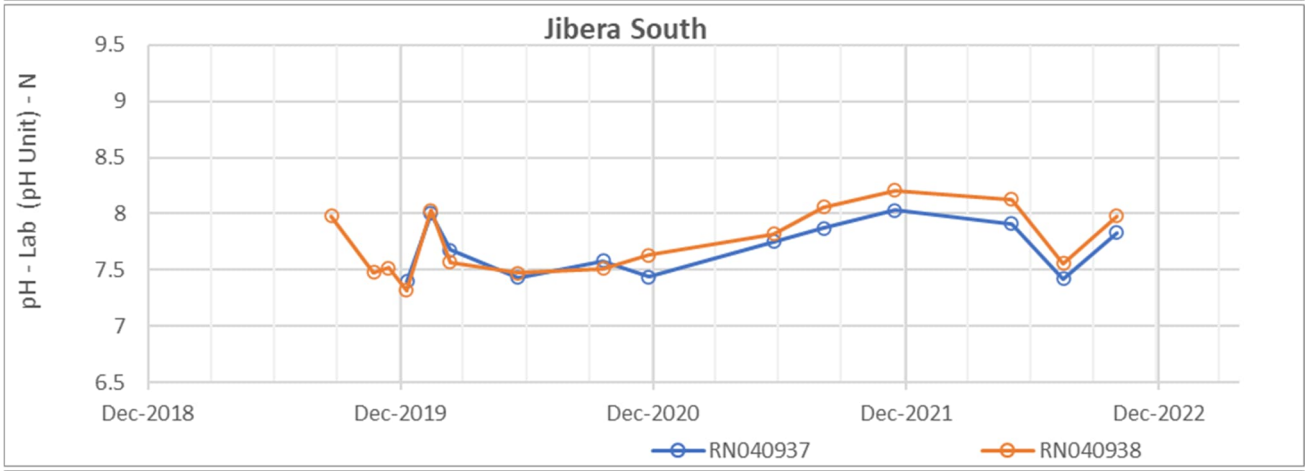
Physiochemical parameters
pH - Field (pH Unit)
Electrical Conductivity - Field (µS/cm)
CH4 - Field (% LEL)
Electrical Conductivity @ 25°C (µS/cm)
Total Dissolved Solids @180°C (mg/L)
pH - Lab (pH Unit)
Suspended Solids (mg/L)
Major ions and nutrients
Bicarbonate Alkalinity as CaCO3 (mg/L)
Carbonate Alkalinity as CaCO3 (mg/L)
Chloride (mg/L)
Sulfate as SO4 2- (mg/L)
Sodium (mg/L)
Potassium (mg/L)
Calcium (mg/L)
Magnesium (mg/L)
Fluoride (mg/L)
Nitrite as N (mg/L)
Nitrate as N (mg/L)
Reactive Silica (mg/L)
Radiological parameters
Gross alpha (Bq/L)
Gross beta activity - 40K (Bq/L)
Dissolved gases
Methane (µg/L)
Ethane (µg/L)
Propane (µg/L)
Petroleum hydrocarbons
C6 - C36 Fraction (Sum) (µg/L)
Sum of BTEX (µg/L)
Sum of polycyclic aromatic hydrocarbons (PAHs) (µg/L)
Dissolved (filtered) metals and metalloids
Aluminium (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silver (mg/L)
Strontium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Total metals and metalloids
Aluminium (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silver (mg/L)
Strontium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Legend
24/5/2021 - 13/2/2023
Min-Max
P10-P50
P50-P90
Ave
Statistics exclude the samples from the

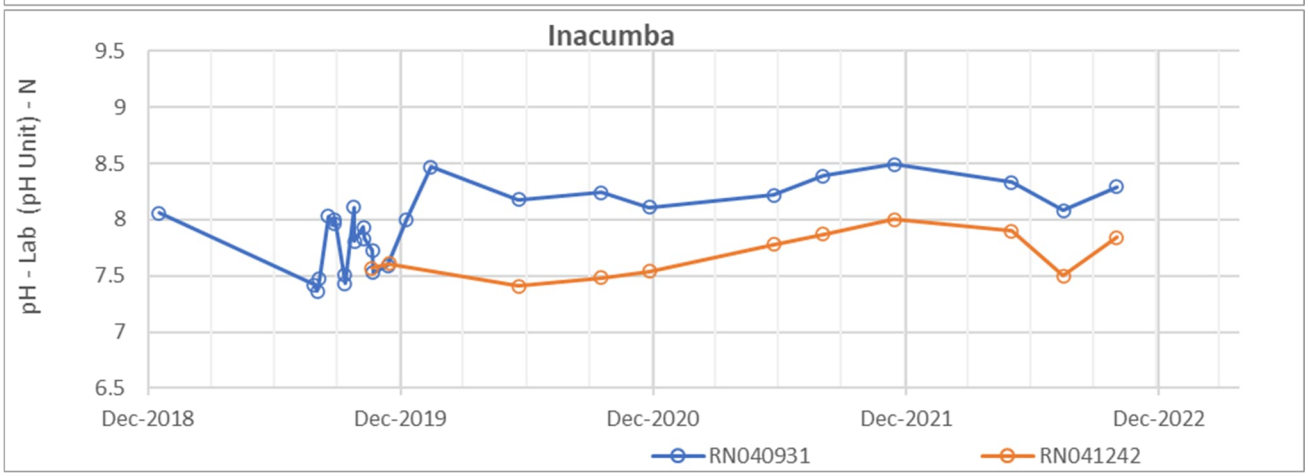
RN040936

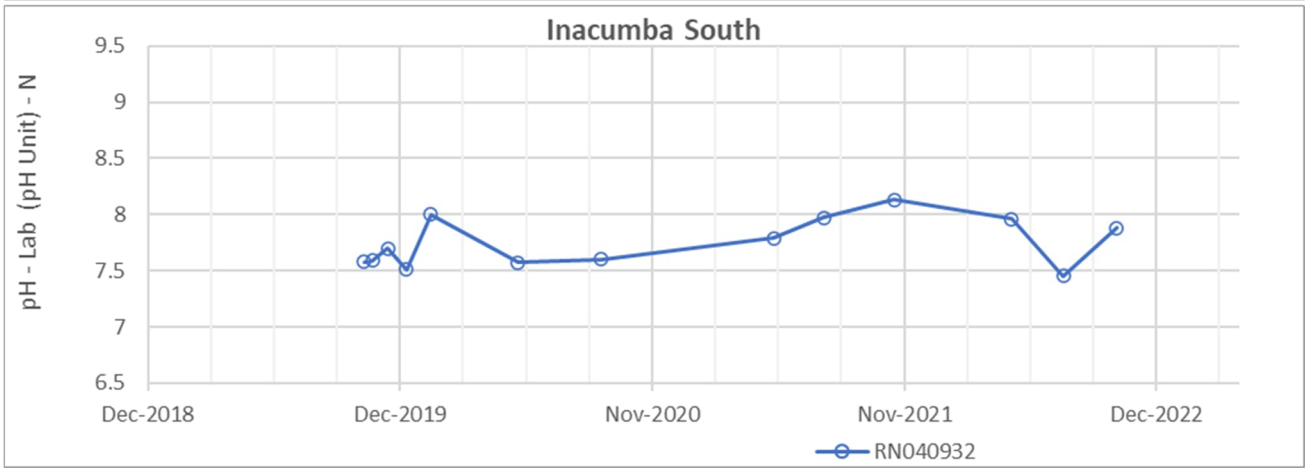

Physiochemical parameters
pH - Field (pH Unit)
Electrical Conductivity - Field (µS/cm)
CH4 - Field (% LEL)
Electrical Conductivity @ 25°C (µS/cm)
Total Dissolved Solids @180°C (mg/L)
pH - Lab (pH Unit)
Suspended Solids (mg/L)
Bicarbonate Alkalinity as CaCO3 (mg/L)
Carbonate Alkalinity as CaCO3 (mg/L)
Major ions and nutrients
Chloride (mg/L)
Sulfate as SO4 2- (mg/L)
Sodium (mg/L)
Potassium (mg/L)
Calcium (mg/L)
Magnesium (mg/L)
Fluoride (mg/L)
Nitrite as N (mg/L)
Nitrate as N (mg/L)
Radiological parameters
Reactive Silica (mg/L)
Gross alpha (Bq/L)
Gross beta activity - 40K (Bq/L)
Dissolved gases
Methane (µg/L)
Ethane (µg/L)
Propane (µg/L)
Petroleum hydrocarbons
C6 - C36 Fraction (Sum) (µg/L)
Sum of BTEX (µg/L)
Sum of polycyclic aromatic hydrocarbons (PAHs) (µg/L)
Dissolved (filtered) metals and metalloids
Aluminium (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silver (mg/L)
Strontium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Total metals and metalloids
Aluminium (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silver (mg/L)
Strontium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Legend
11/1/2023
Min-Max
P10-P50
P50-P90
Ave
Statistics exclude the samples from the

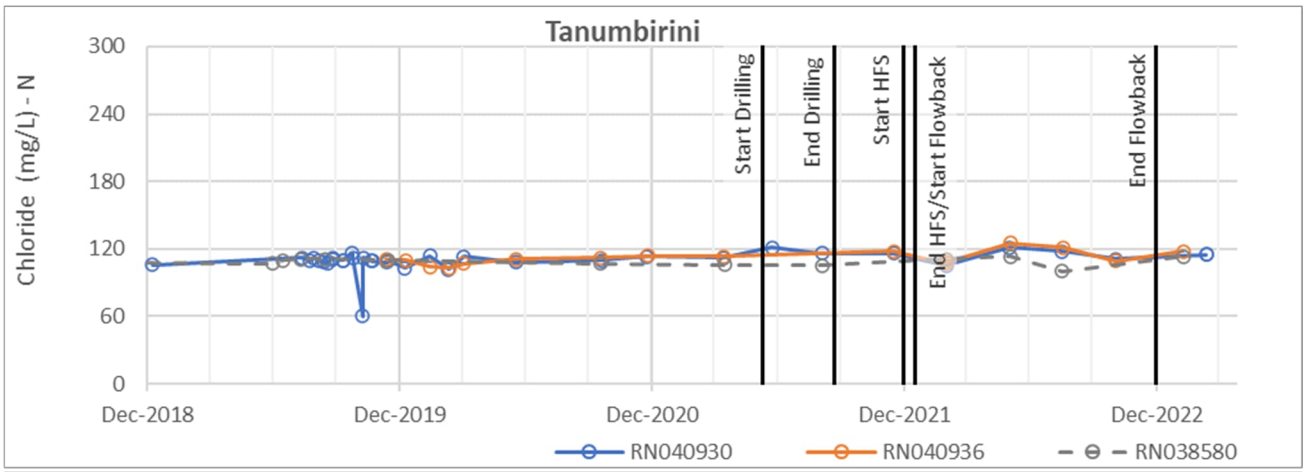
Attachment C – Tanumbirini - Timeseries chemistry charts (including other Santos monitoring bores)

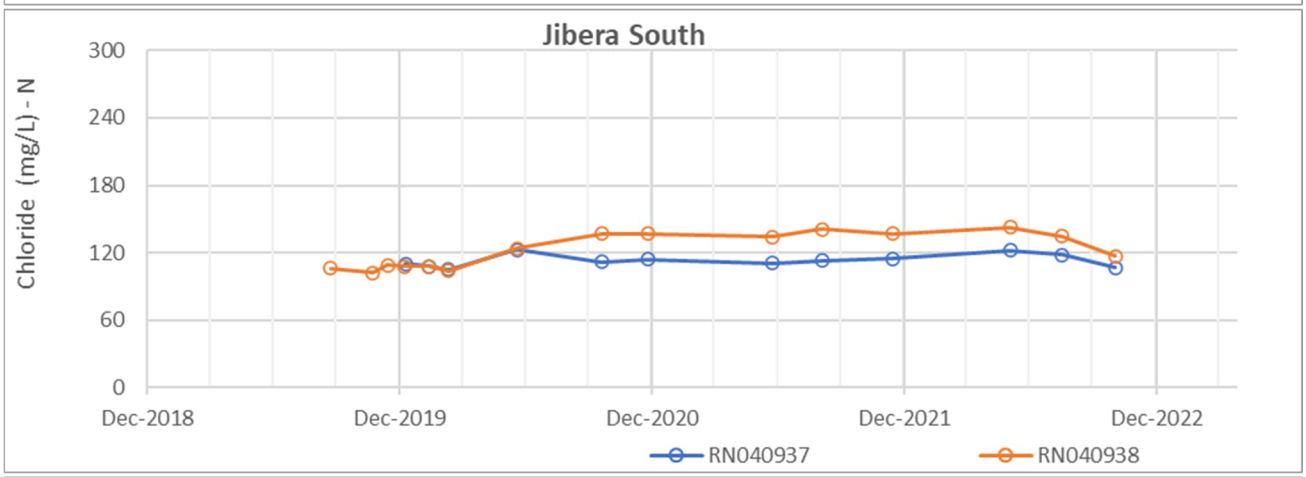

Tanumbirini
pH - Lab (pH Unit) - N
9.5
9
8.5
8
7.5
7
6.5
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
RN040936
RN038580

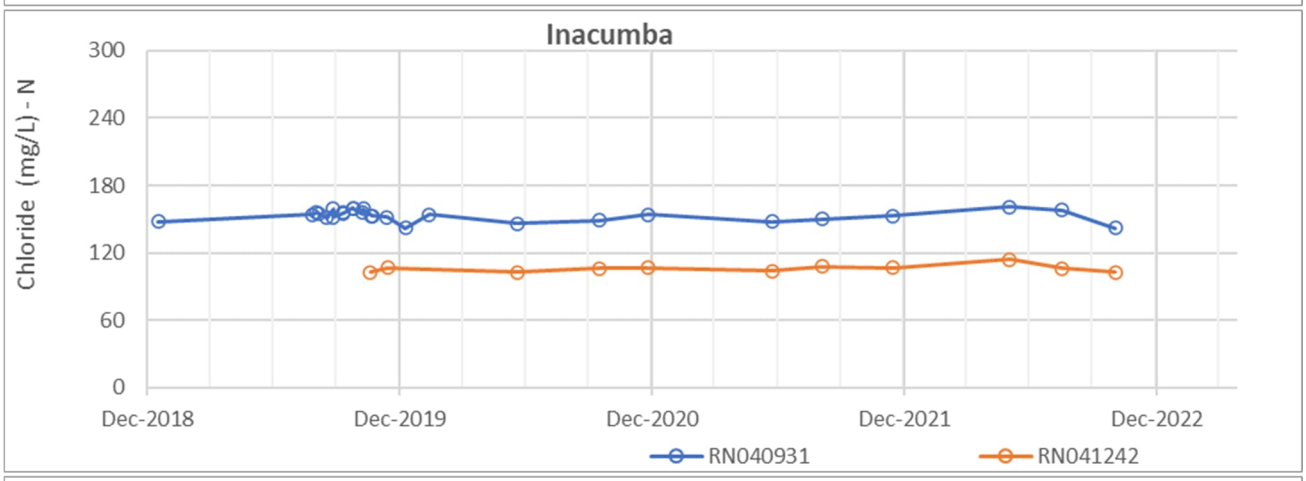

Jibera South
pH - Lab (pH Unit) - N
9.5
9
8.5
8
7.5
7
6.5
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938

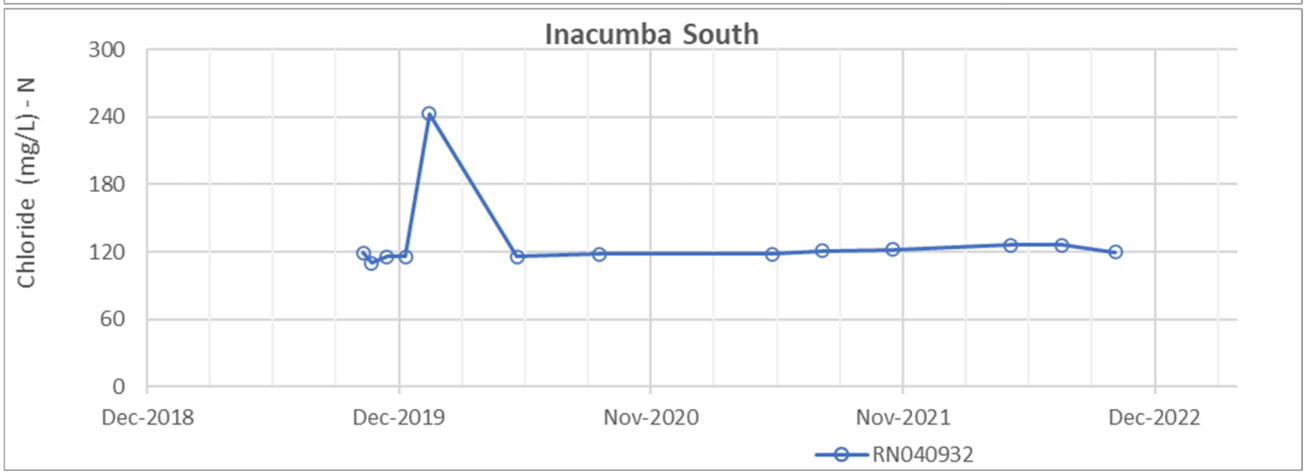

Inacumba
pH - Lab (pH Unit) - N
9.5
9
8.5
8
7.5
7
6.5
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242

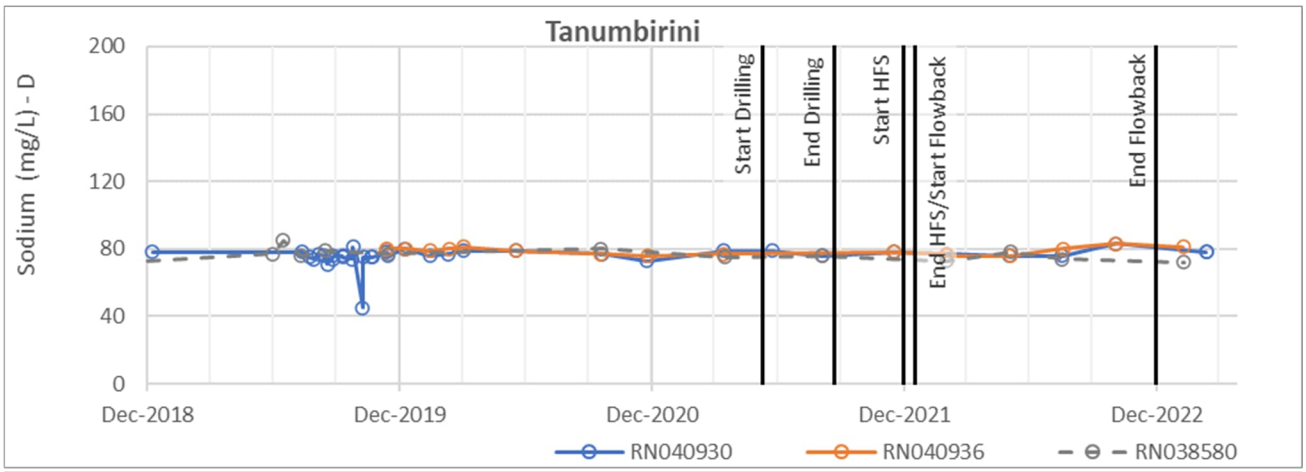

Inacumba South
pH - Lab (pH Unit) - N
9.5
9
8.5
8
7.5
7
6.5
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932

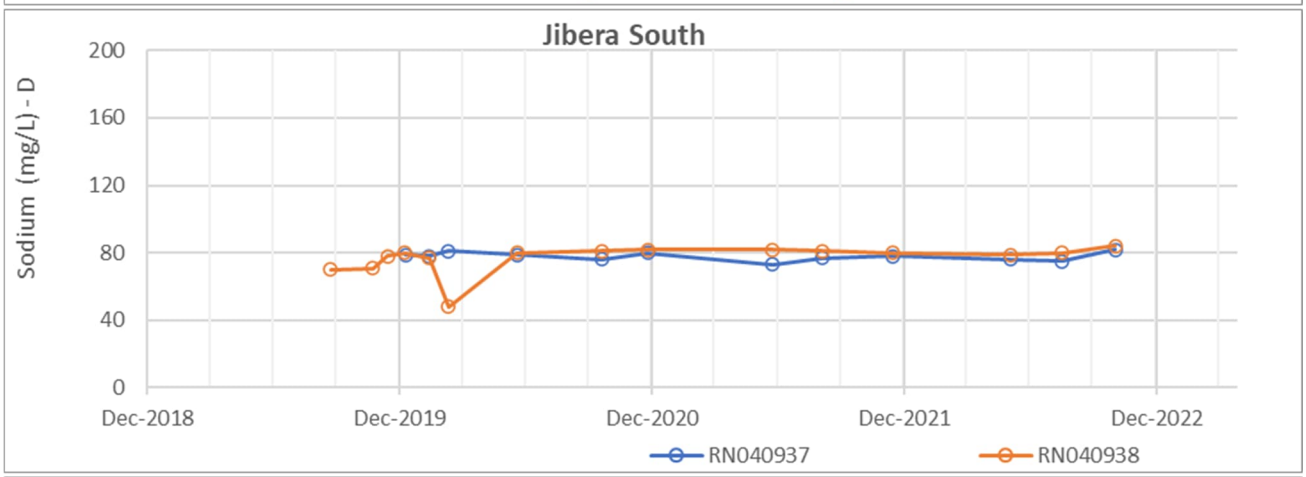

Tanumbirini
Chloride (mg/L) - N
300
240
180
120
60
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
RN040936
RN038580

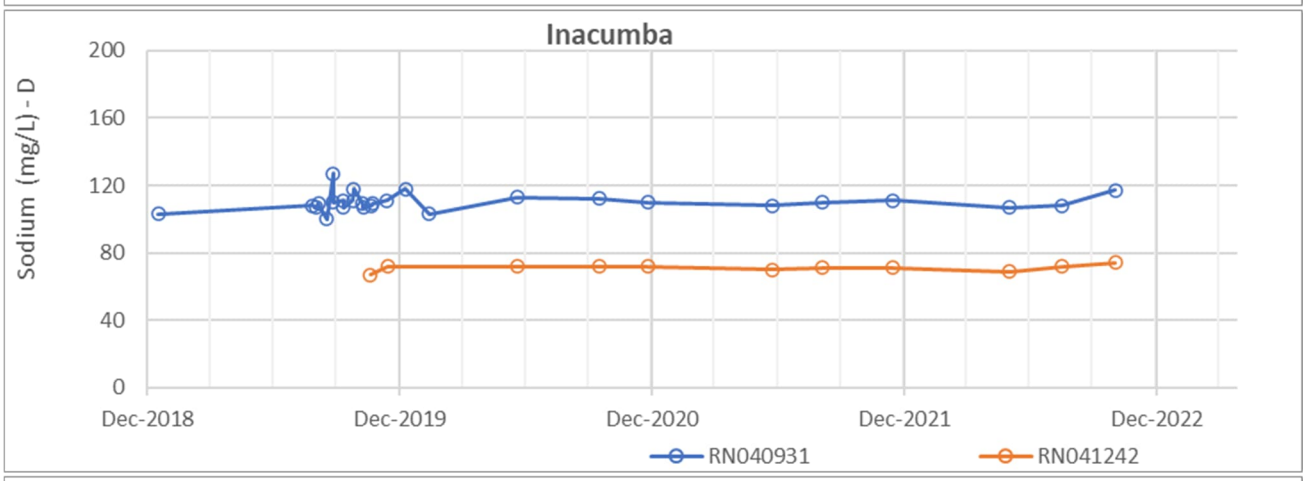

Jibera South
Chloride (mg/L) - N
300
240
180
120
60
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938

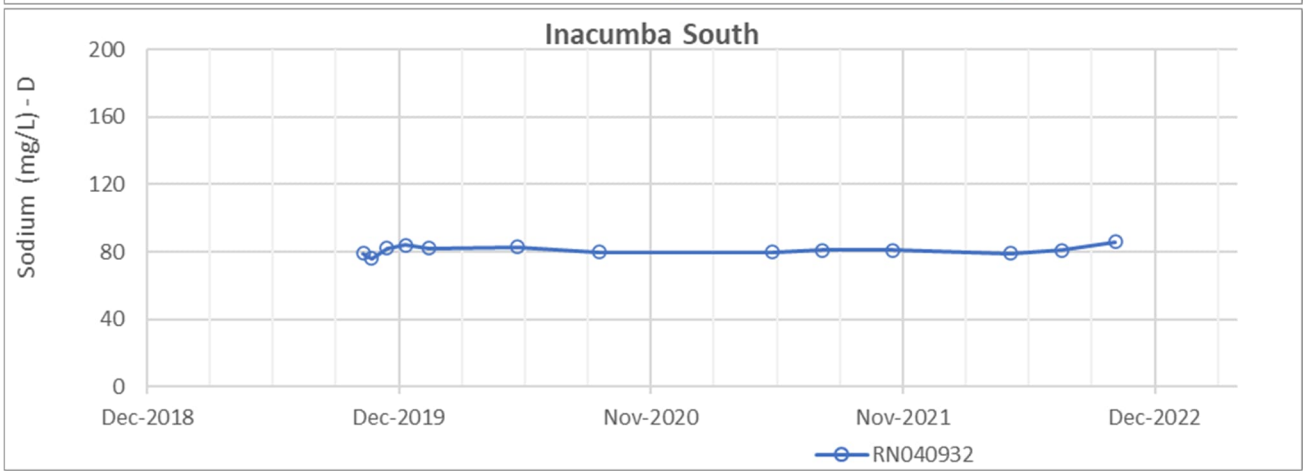

Inacumba
Chloride (mg/L) - N
300
240
180
120
60
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242

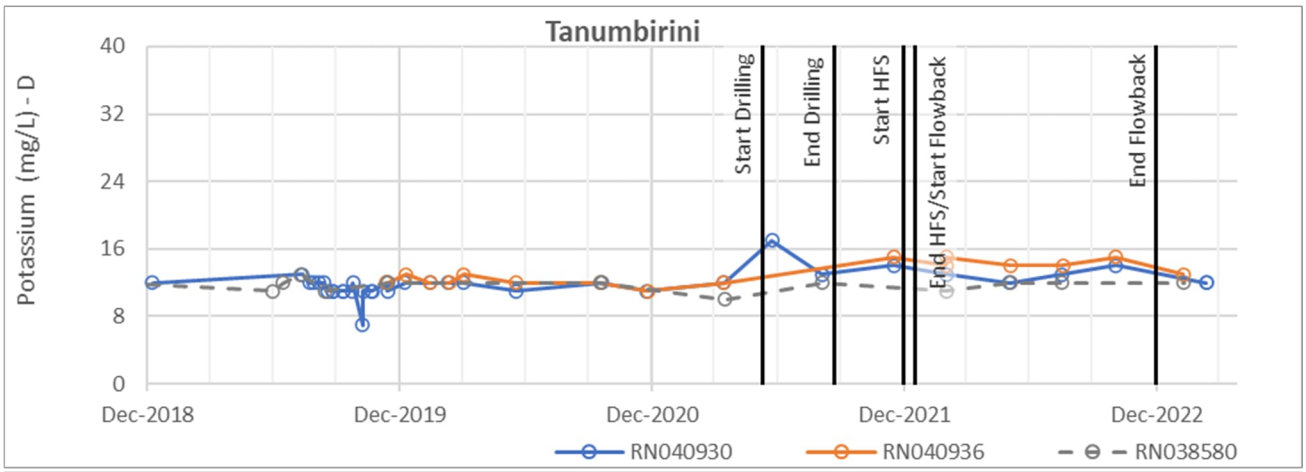

Inacumba South
Chloride (mg/L) - N
300
240
180
120
60
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932

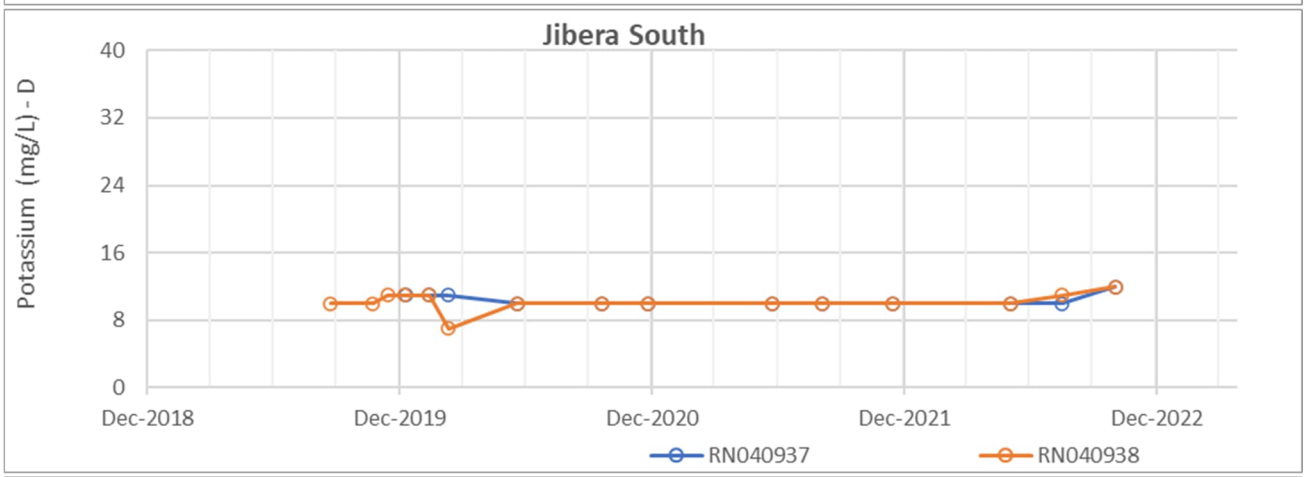

Tanumbirini
Sodium (mg/L) - D
200
160
120
80
40
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
RN040936
RN038580

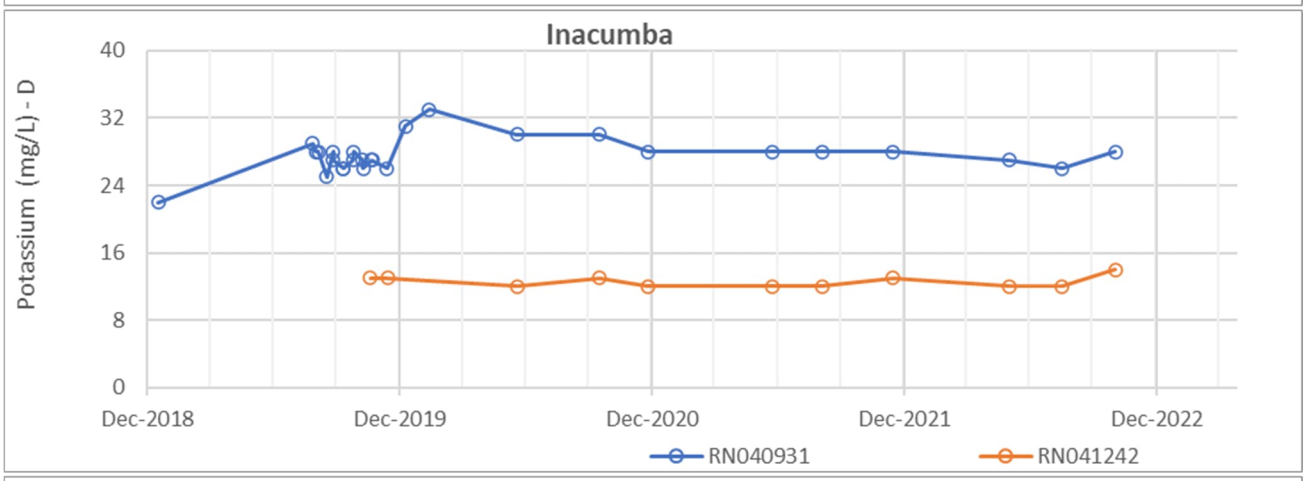

Jibera South
Sodium (mg/L) - D
200
160
120
80
40
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938

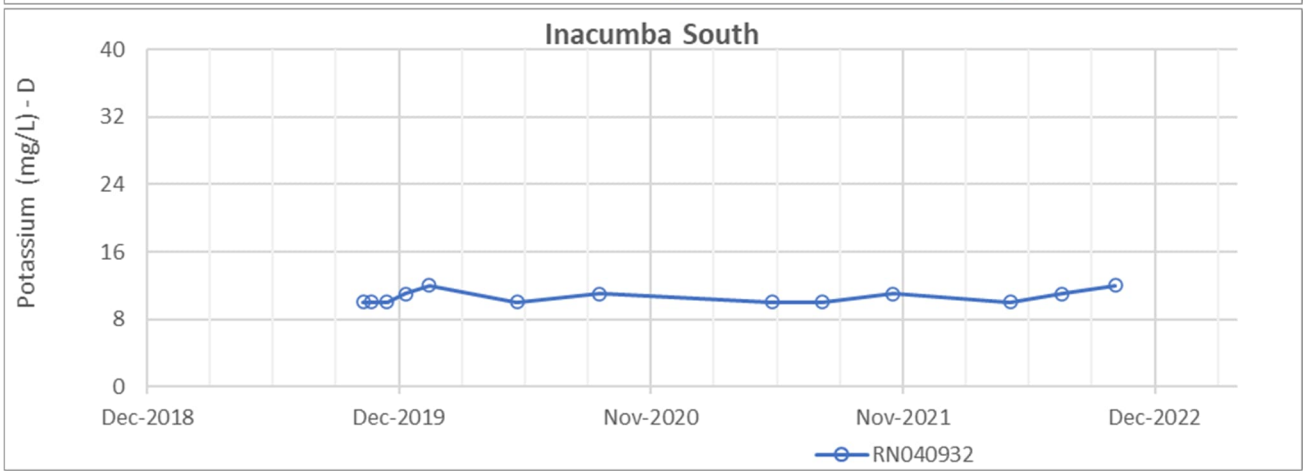

Inacumba
Sodium (mg/L) - D
200
160
120
80
40
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242


Inacumba South
Sodium (mg/L) - D
200
160
120
80
40
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932


Tanumbirini
Potassium (mg/L) - D
40
32
24
16
8
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
RN040936
RN038580


Jibera South
Potassium (mg/L) - D
40
32
24
16
8
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938


Inacumba
Potassium (mg/L) - D
40
32
24
16
8
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242


Inacumba South
Potassium (mg/L) - D
40
32
24
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Nov-2020
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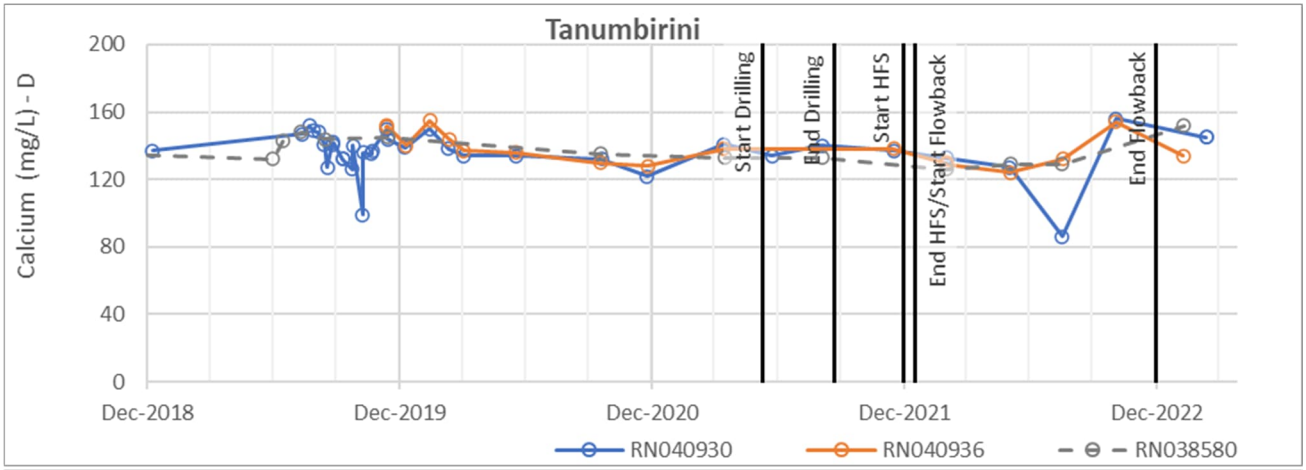
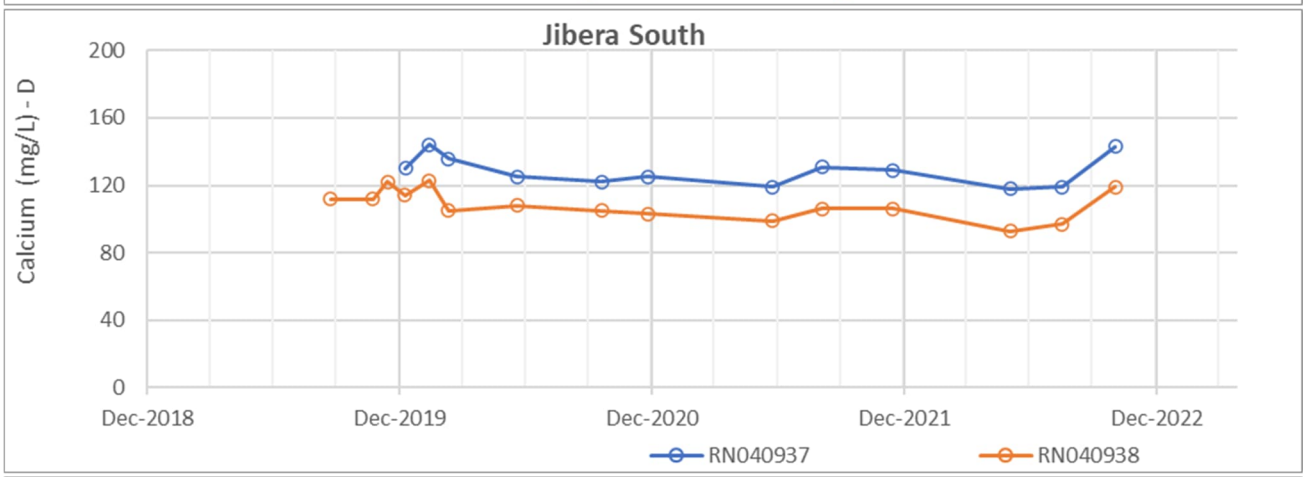
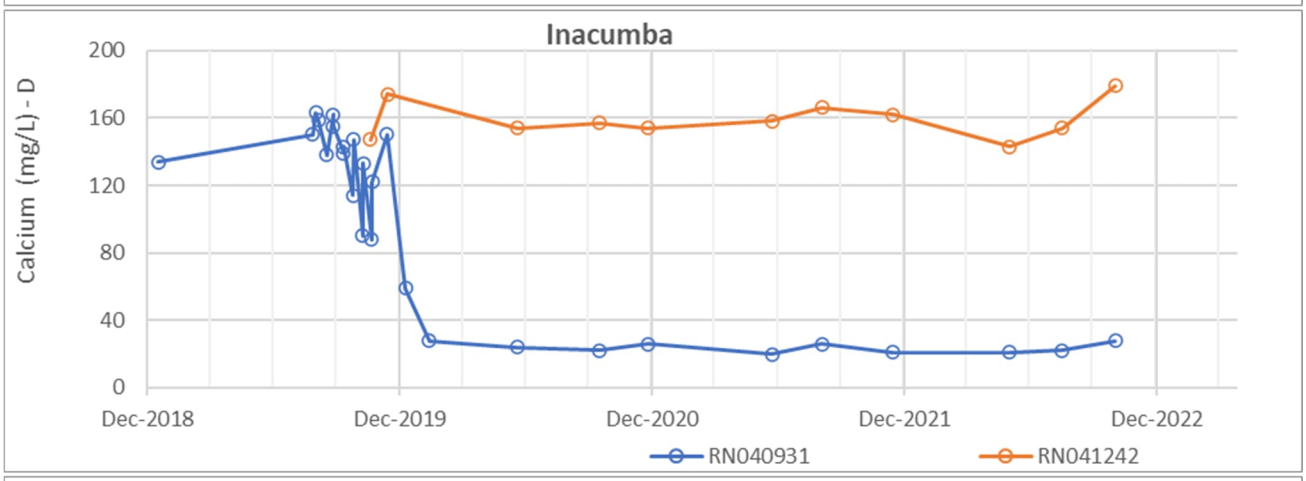
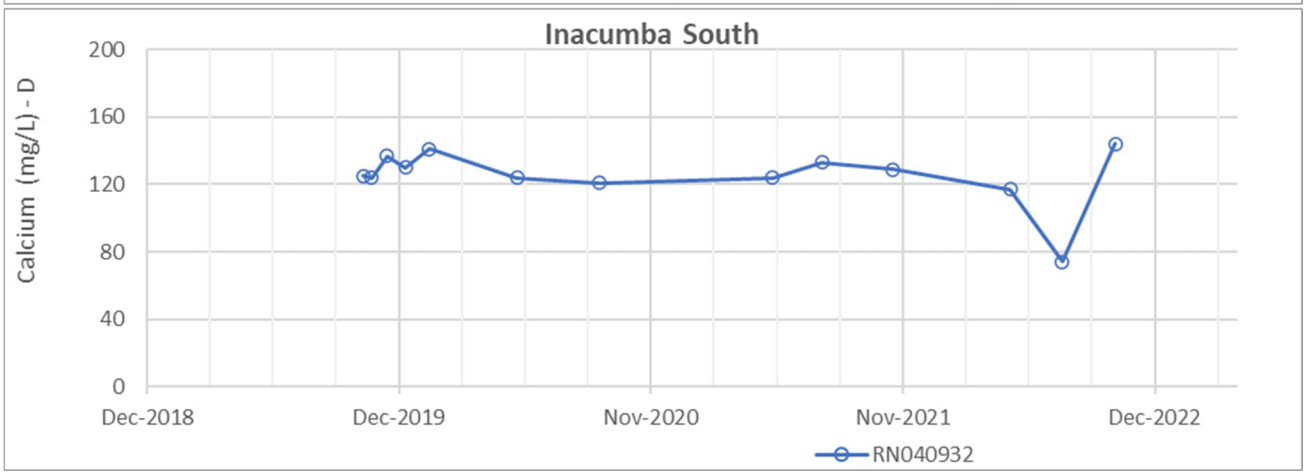
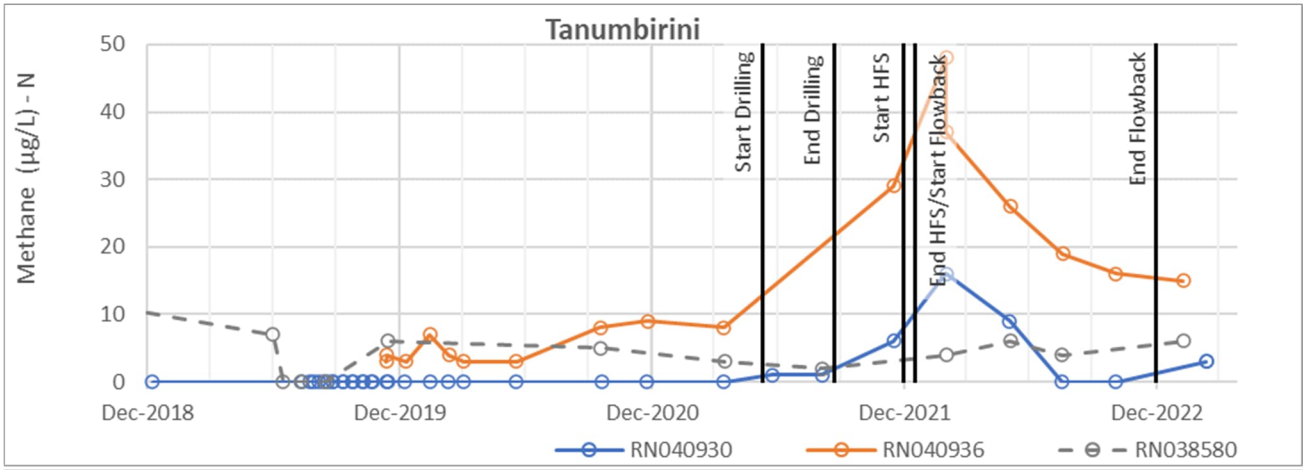
Dec-2022
RN040932

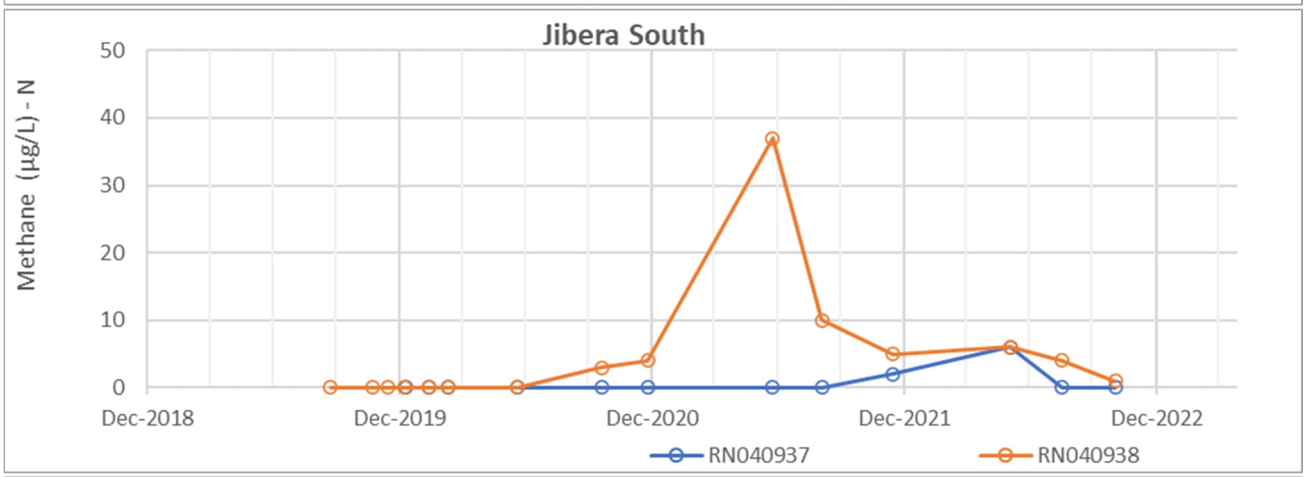

Tanumbirini
Calcium (mg/L) - D
200
160
120
80
40
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
RN040936
RN038580

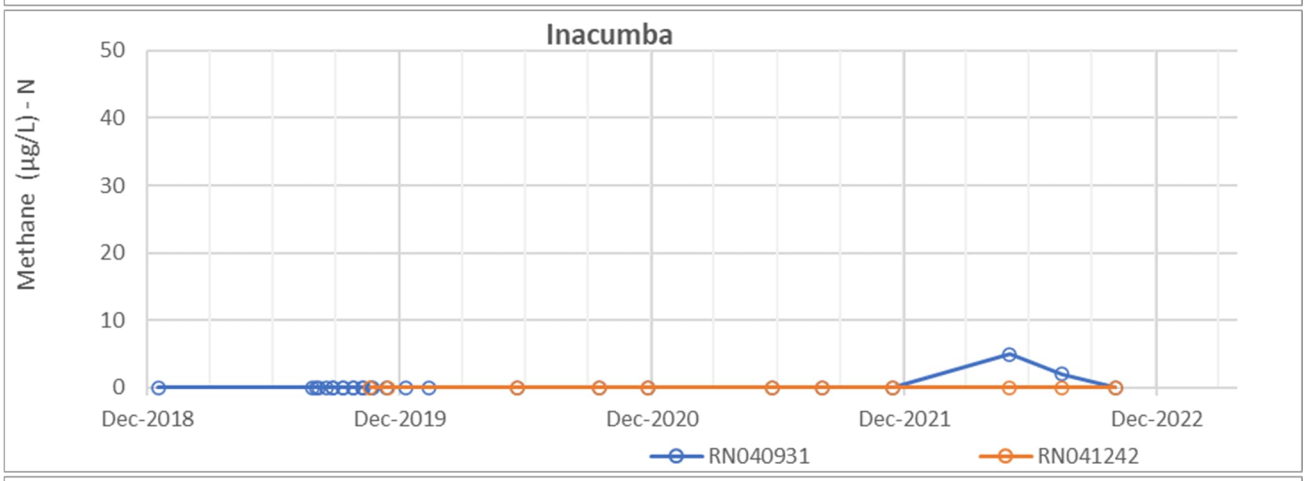

Jibera South
Calcium (mg/L) - D
200
160
120
80
40
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938

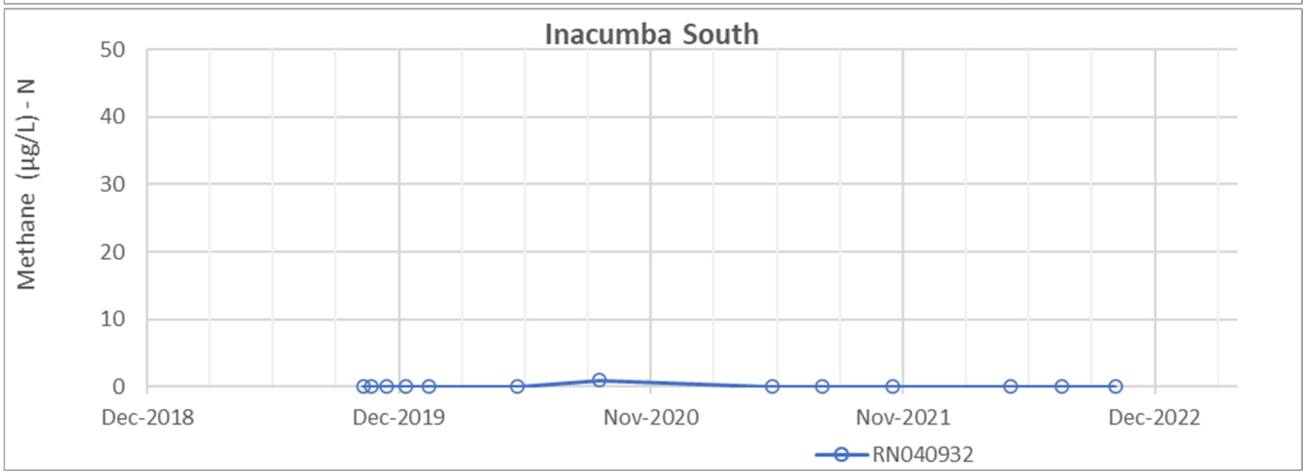

Inacumba
Calcium (mg/L) - D
200
160
120
80
40
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242

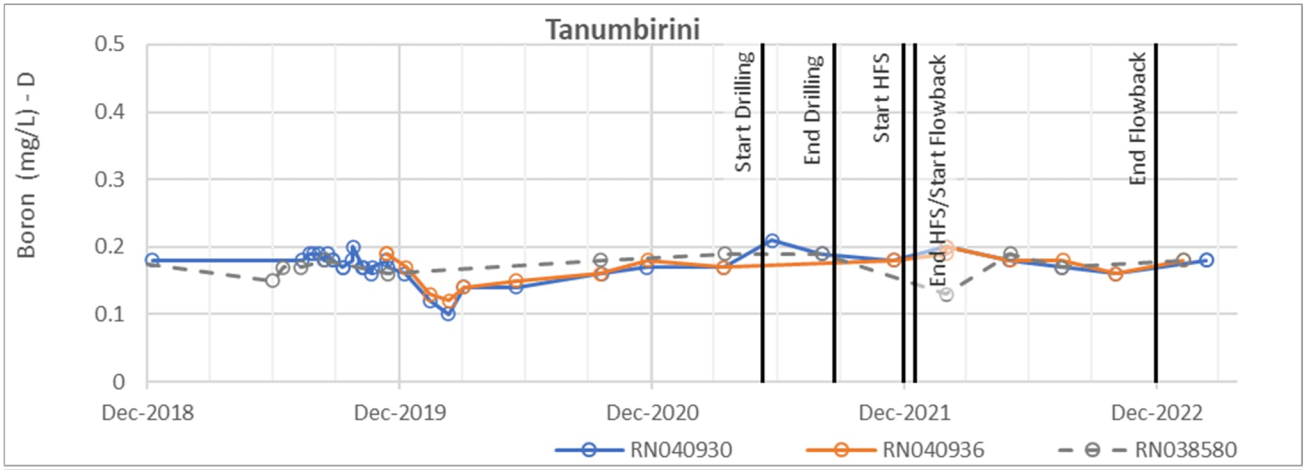

Inacumba South
Calcium (mg/L) - D
200
160
120
80
40
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932


Tanumbirini
Methane (µg/L) - N
50
40
30
20
10
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
RN040936
RN038580


Jibera South
Methane (µg/L) - N
50
40
30
20
10
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938


Inacumba
Methane (µg/L) - N
50
40
30
20
10
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242


Inacumba South
Methane (µg/L) - N
50
40
30
20
10
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932


Tanumbirini
Boron (mg/L) - D
0.5
0.4
0.3
0.2
0.1
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
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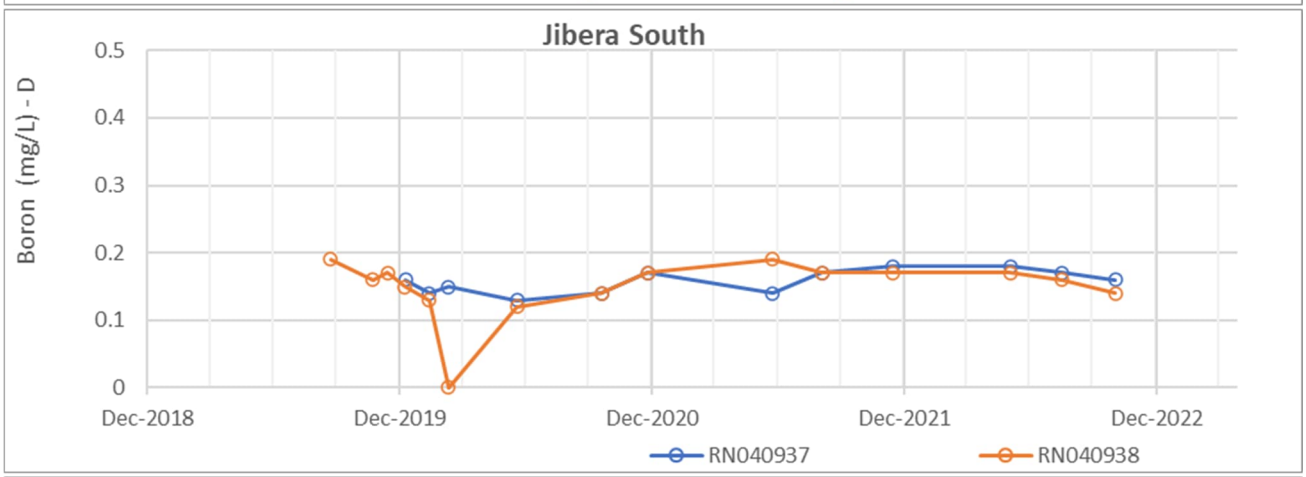
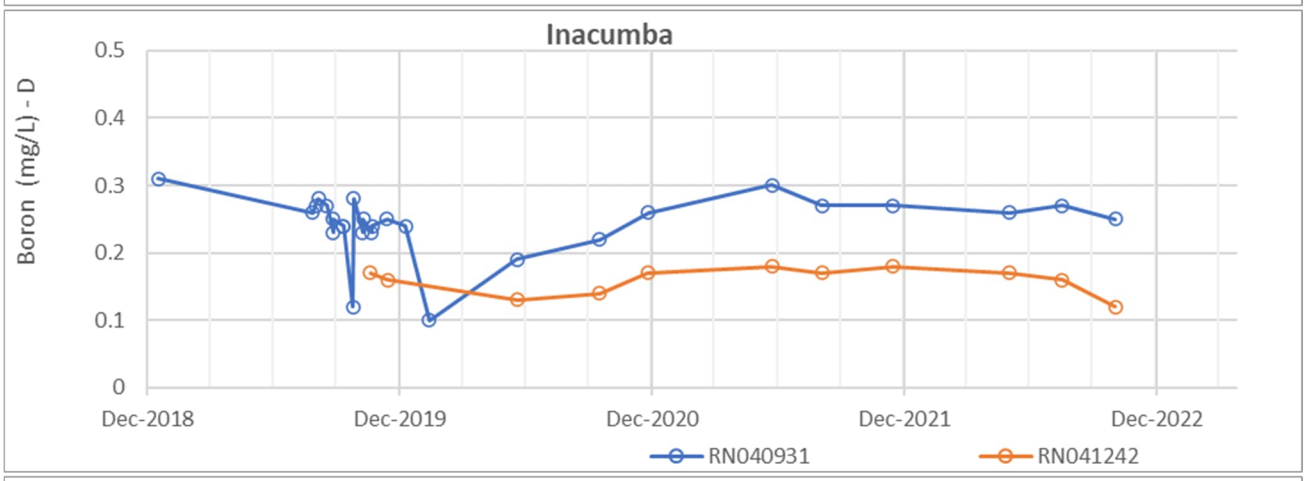
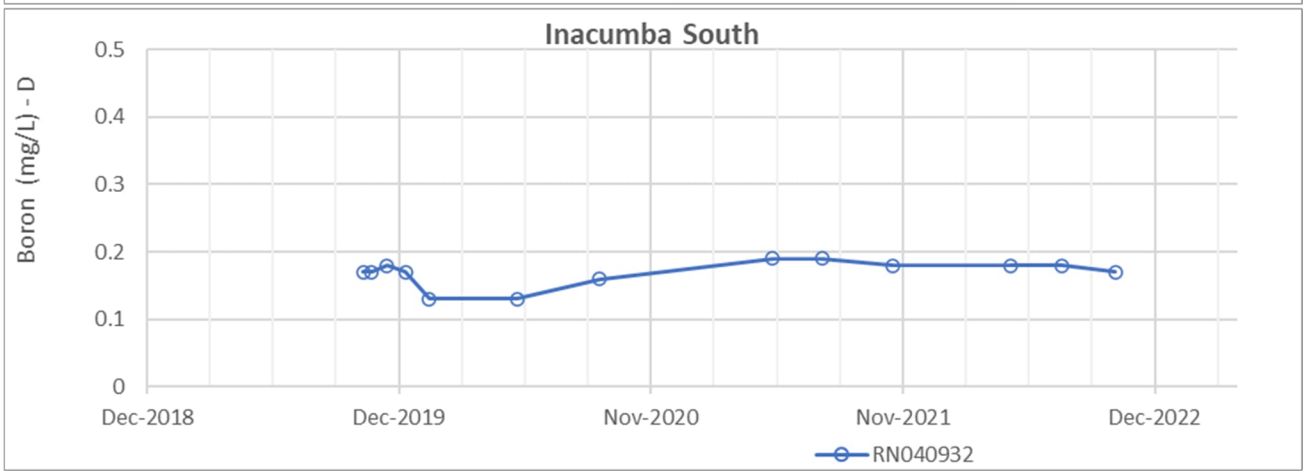
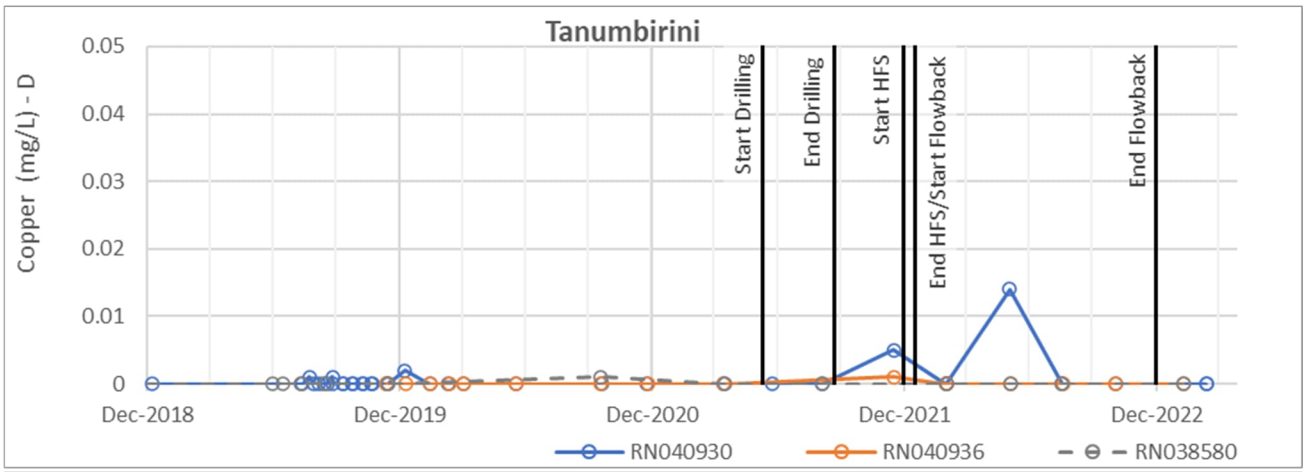
RN038580


Jibera South
Boron (mg/L) - D
0.5
0.4
0.3
0.2
0.1
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938


Inacumba
Boron (mg/L) - D
0.5
0.4
0.3
0.2
0.1
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242


Inacumba South
Boron (mg/L) - D
0.5
0.4
0.3
0.2
0.1
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932


Tanumbirini
Copper (mg/L) - D
0.05
0.04
0.03
0.02
0.01
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
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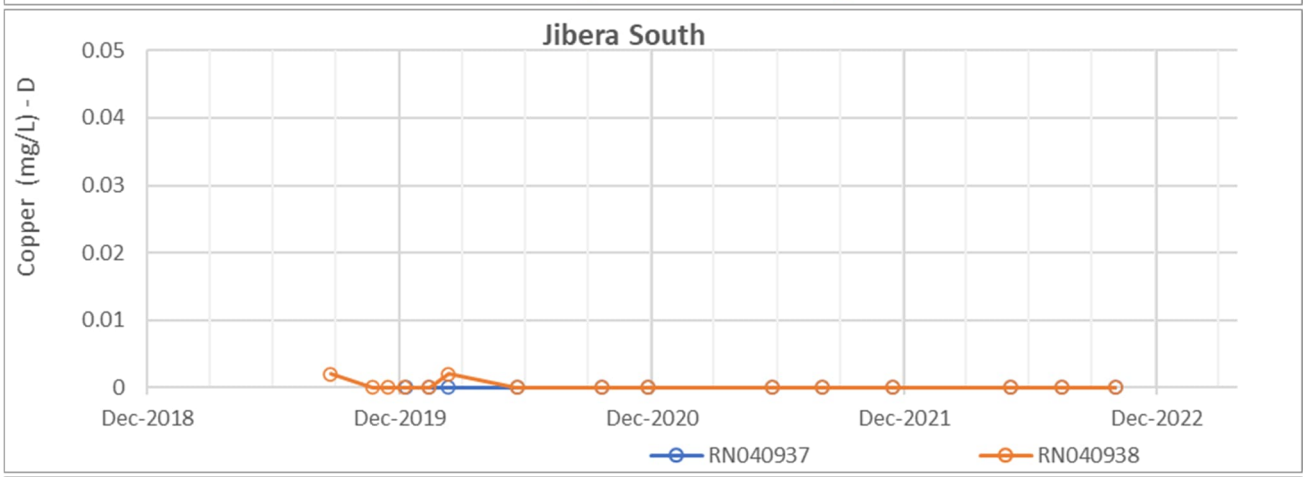
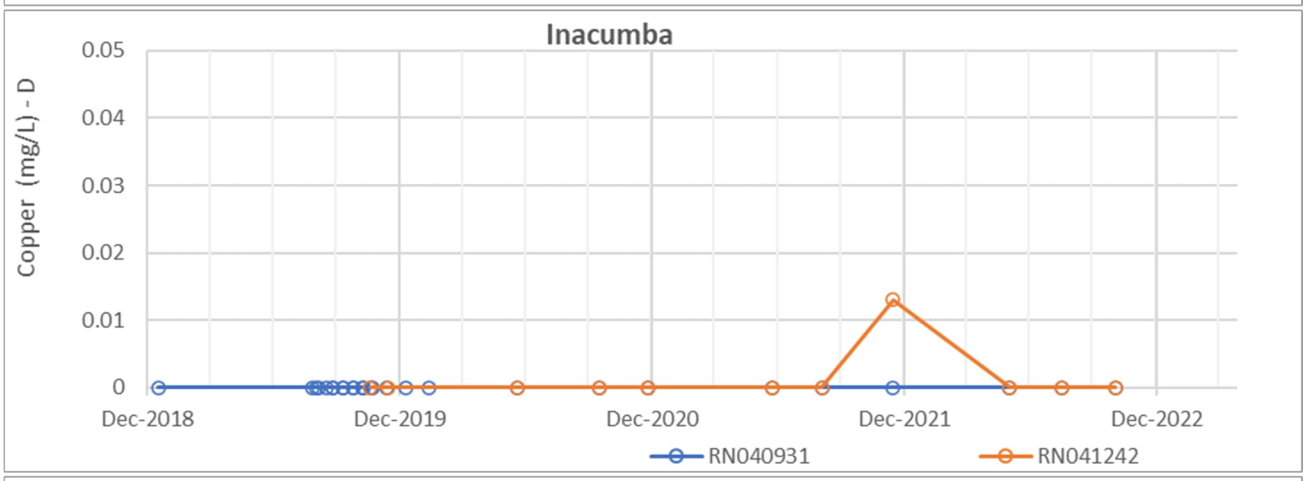
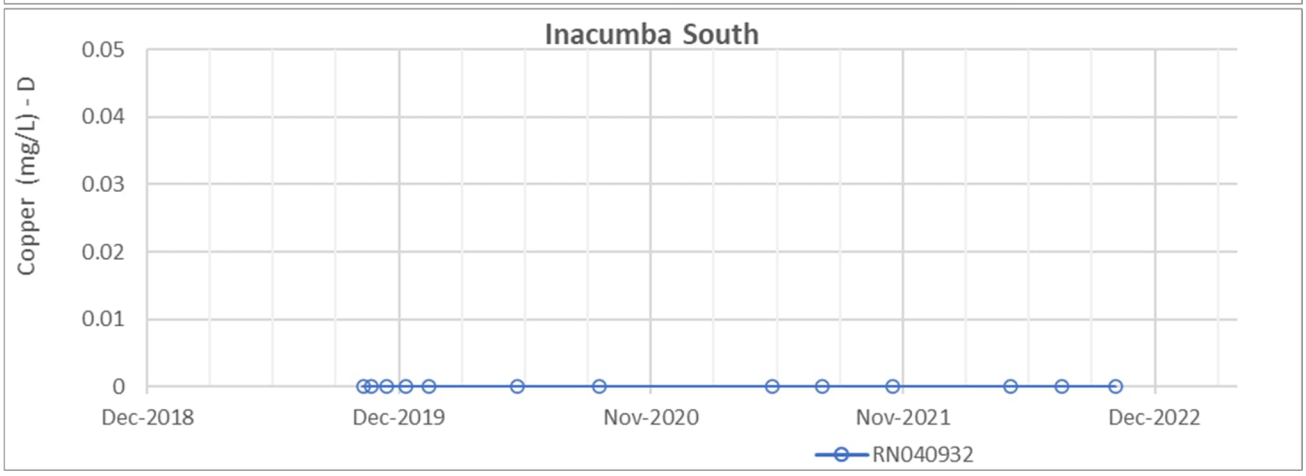
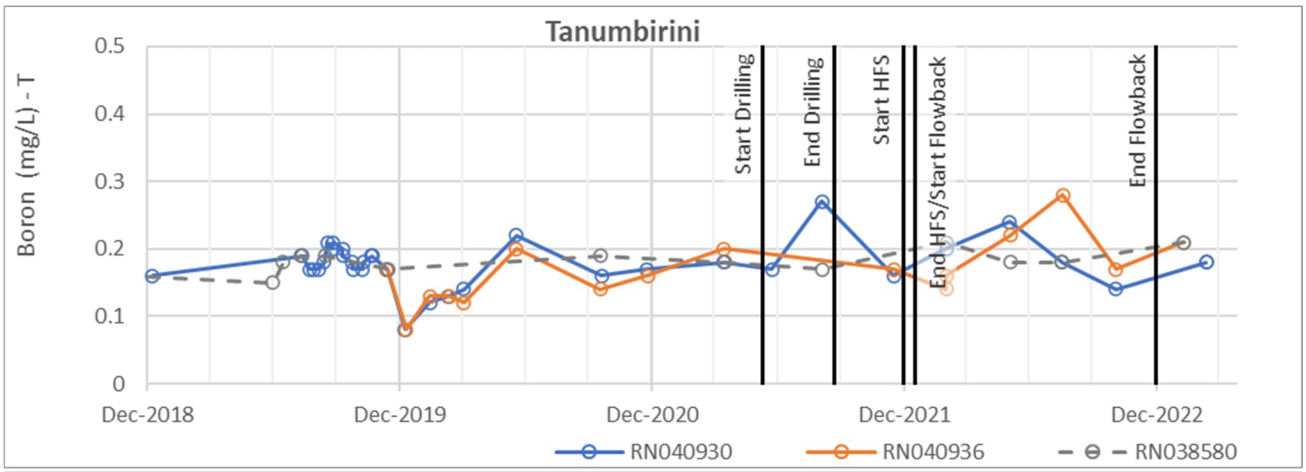

Jibera South
Copper (mg/L) - D
0.05
0.04
0.03
0.02
0.01
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938


Inacumba
Copper (mg/L) - D
0.05
0.04
0.03
0.02
0.01
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242


Inacumba South
Copper (mg/L) - D
0.05
0.04
0.03
0.02
0.01
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932


Tanumbirini
Boron (mg/L) - T
0.5
0.4
0.3
0.2
0.1
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
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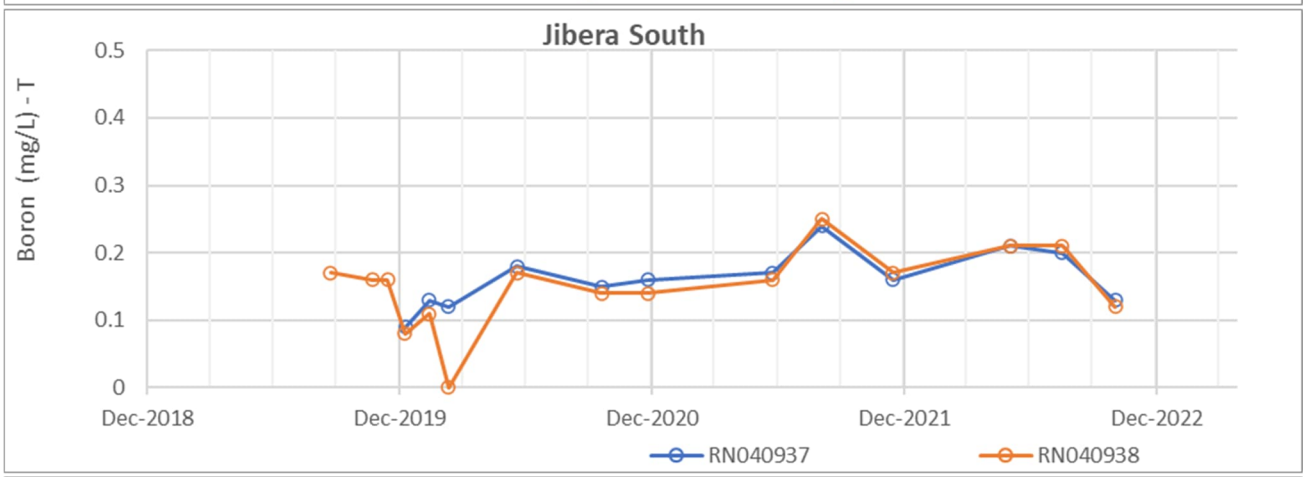
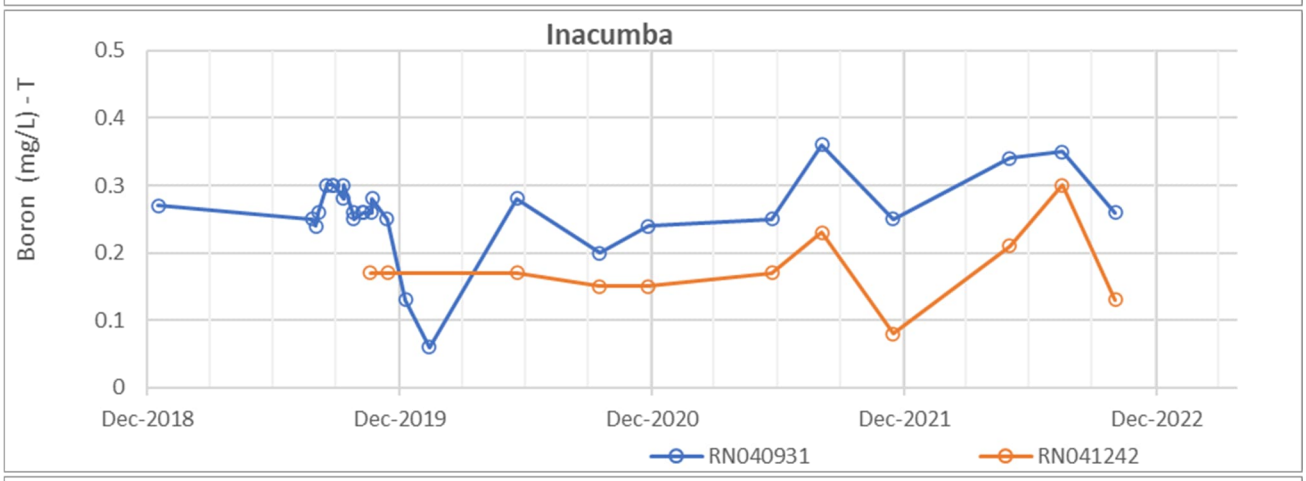
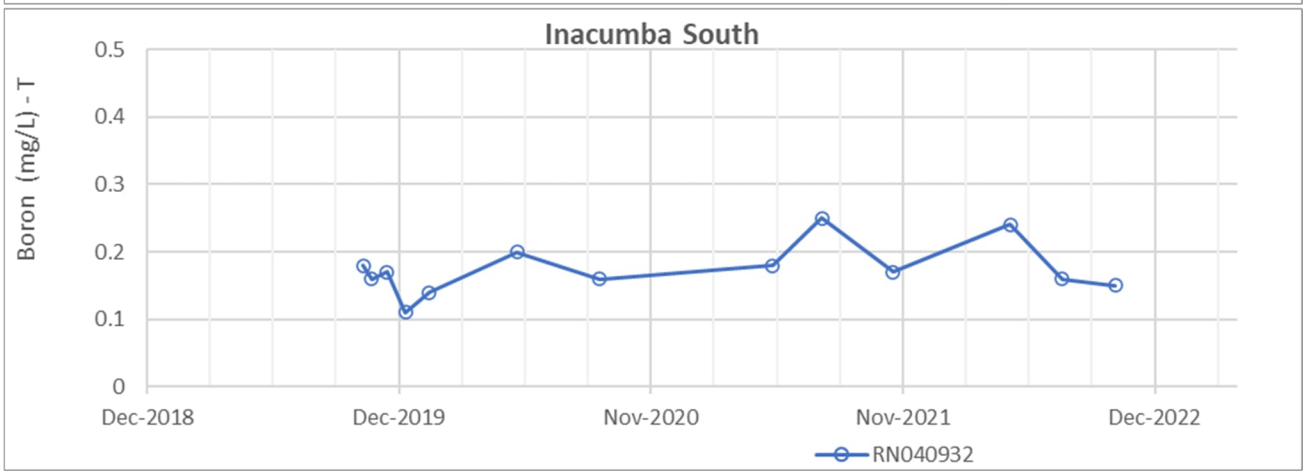
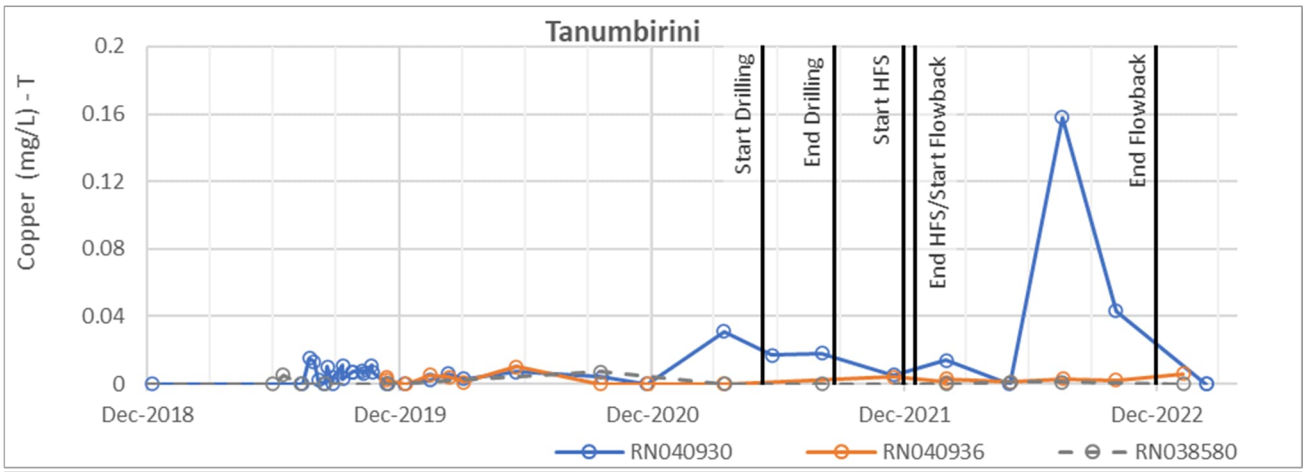

Jibera South
Boron (mg/L) - T
0.5
0.4
0.3
0.2
0.1
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938


Inacumba
Boron (mg/L) - T
0.5
0.4
0.3
0.2
0.1
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242


Inacumba South
Boron (mg/L) - T
0.5
0.4
0.3
0.2
0.1
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932


Tanumbirini
Copper (mg/L) - T
0.2
0.16
0.12
0.08
0.04
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
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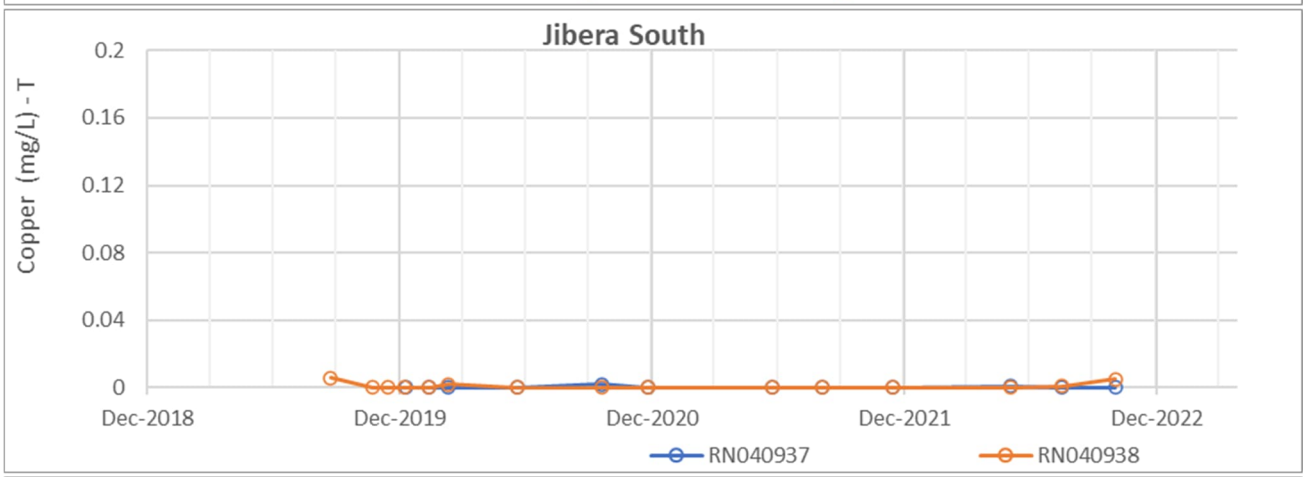
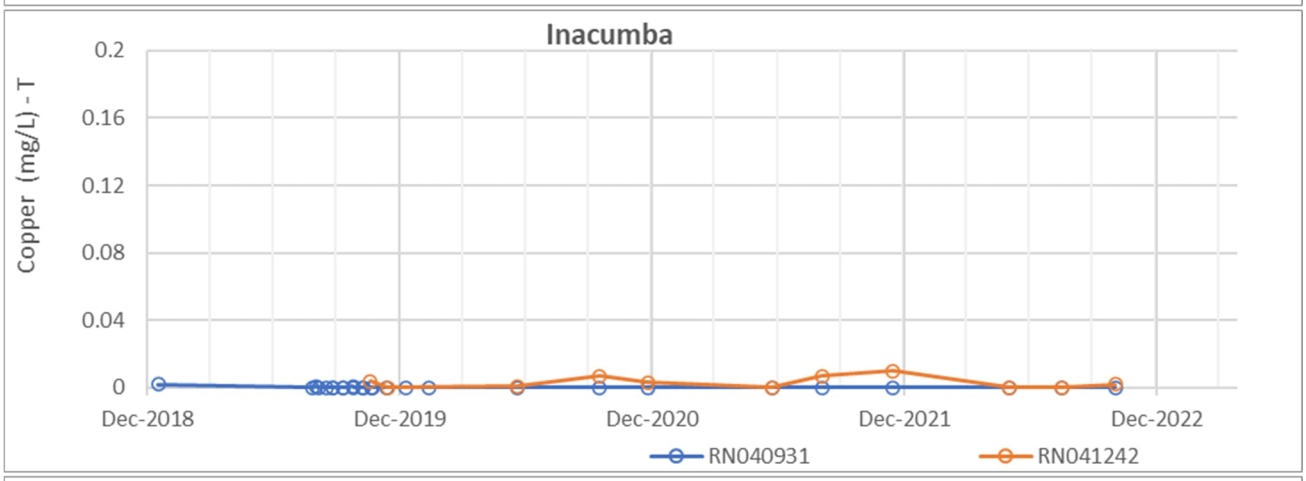
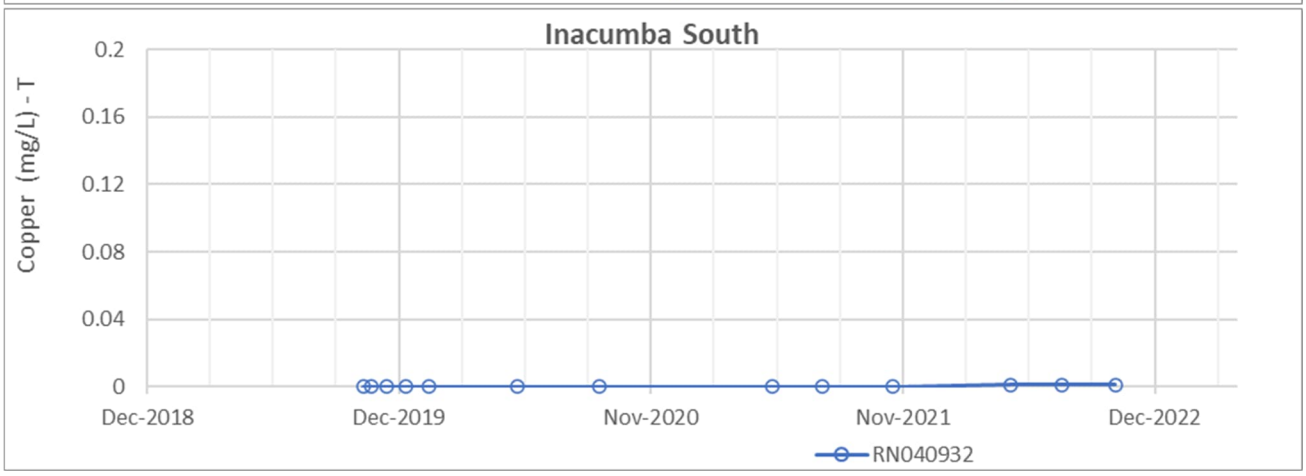
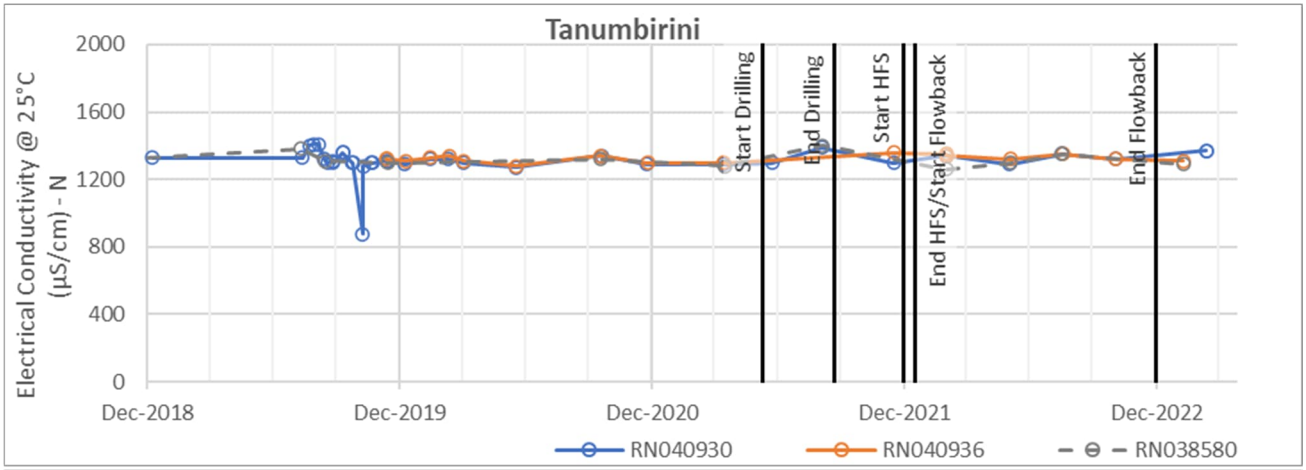
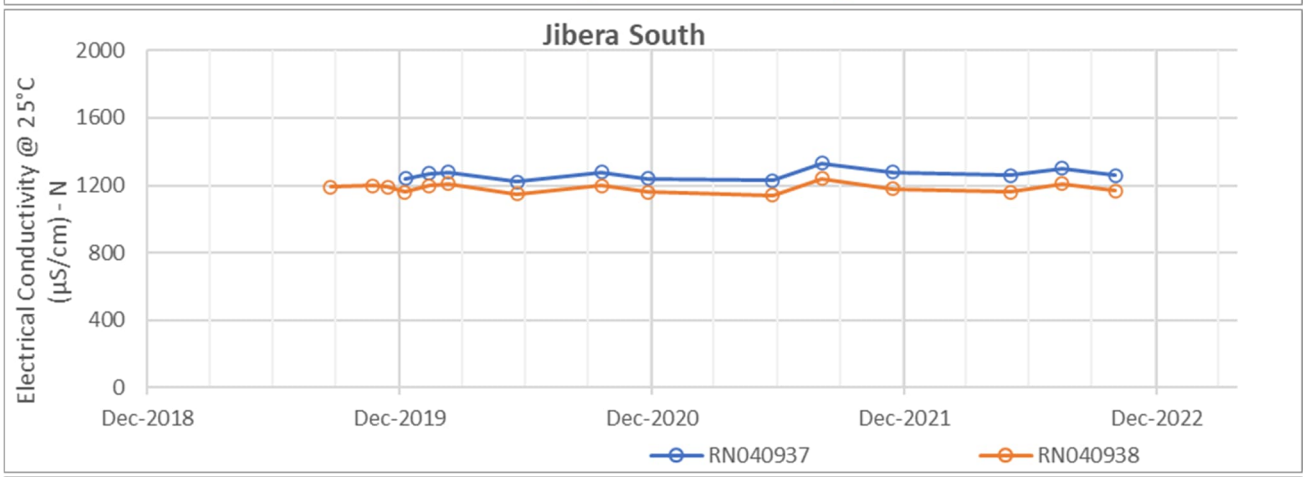
RN038580

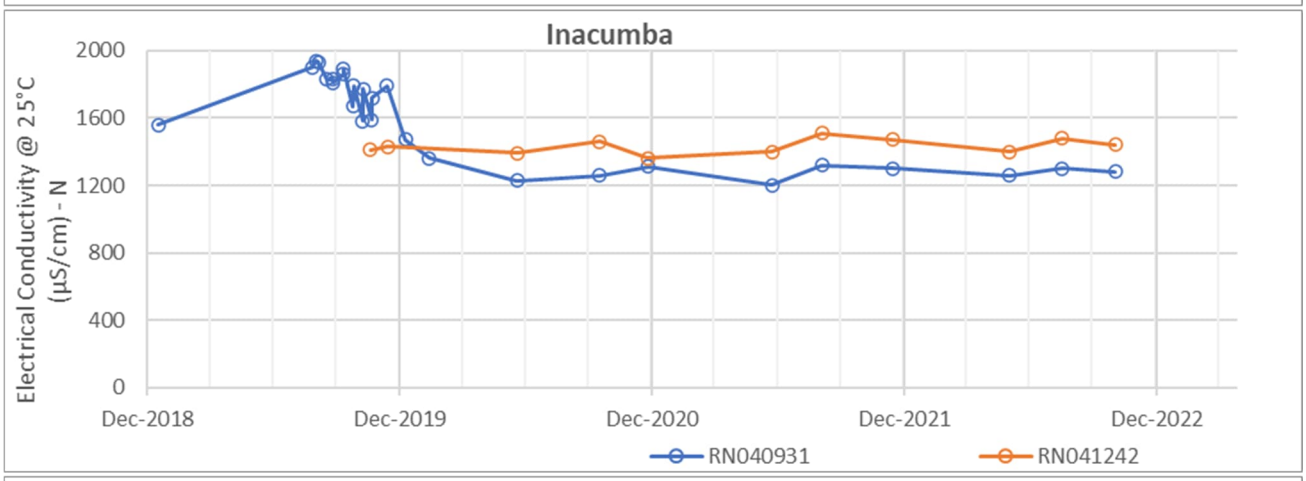

Jibera South
Copper (mg/L) - T
0.2
0.16
0.12
0.08
0.04
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938

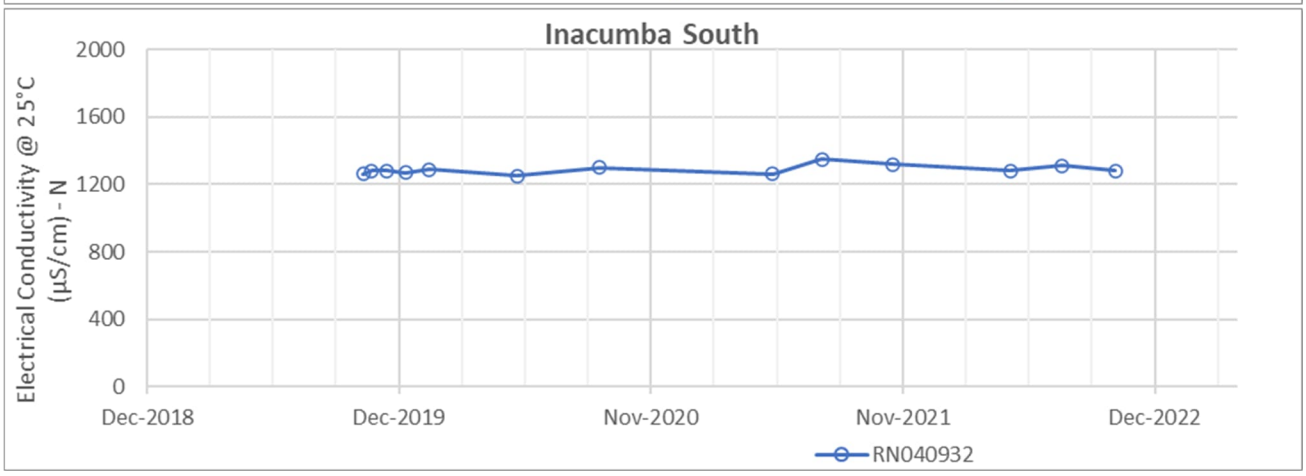

Inacumba
Copper (mg/L) - T
0.2
0.16
0.12
0.08
0.04
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242

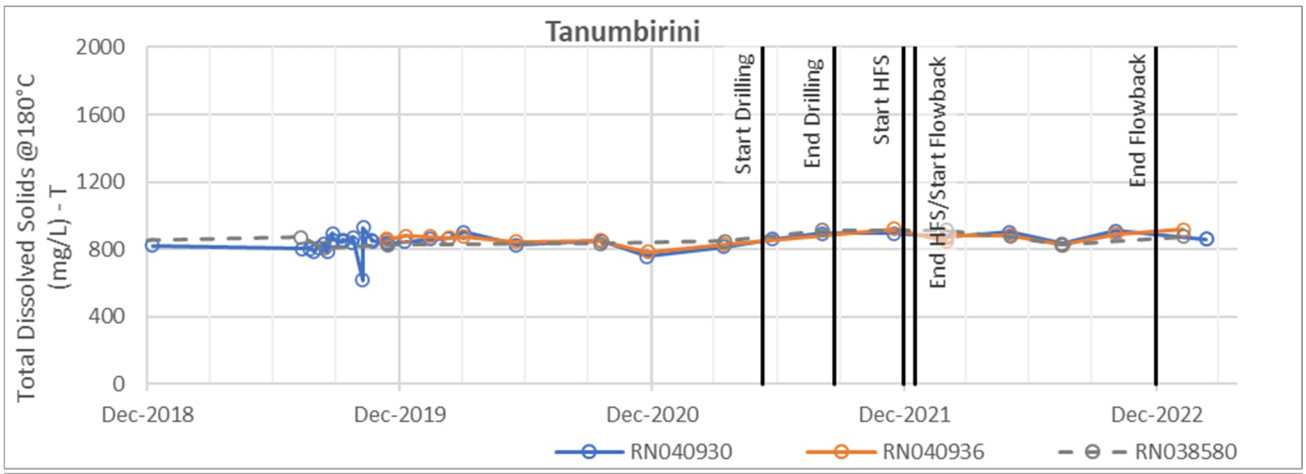

Inacumba South
Copper (mg/L) - T
0.2
0.16
0.12
0.08
0.04
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932

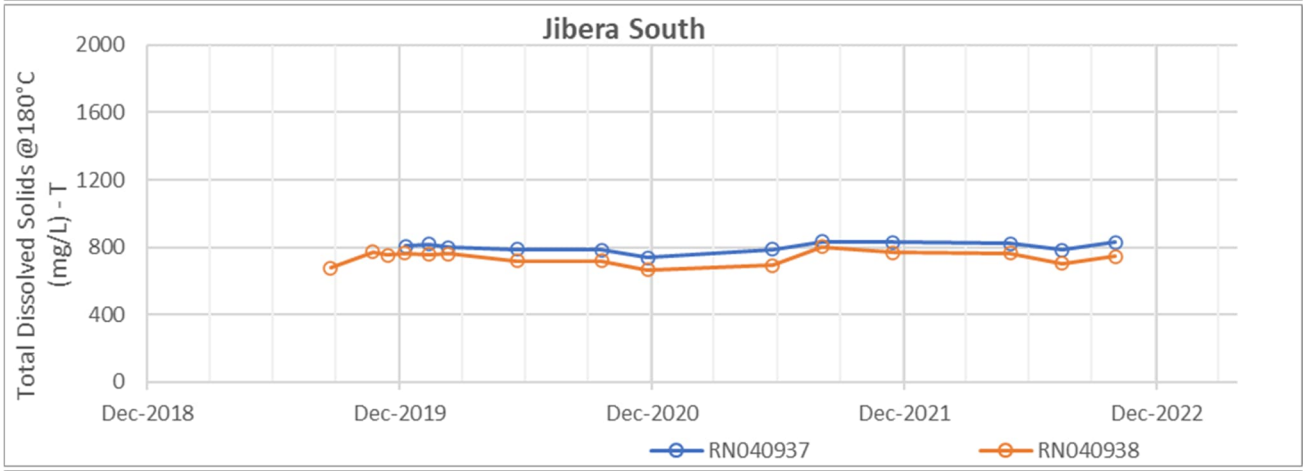

Tanumbirini
Electrical Conductivity @ 25°C (µS/cm) - N
2000
1600
1200
800
400
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
RN040930
RN040936
RN038580

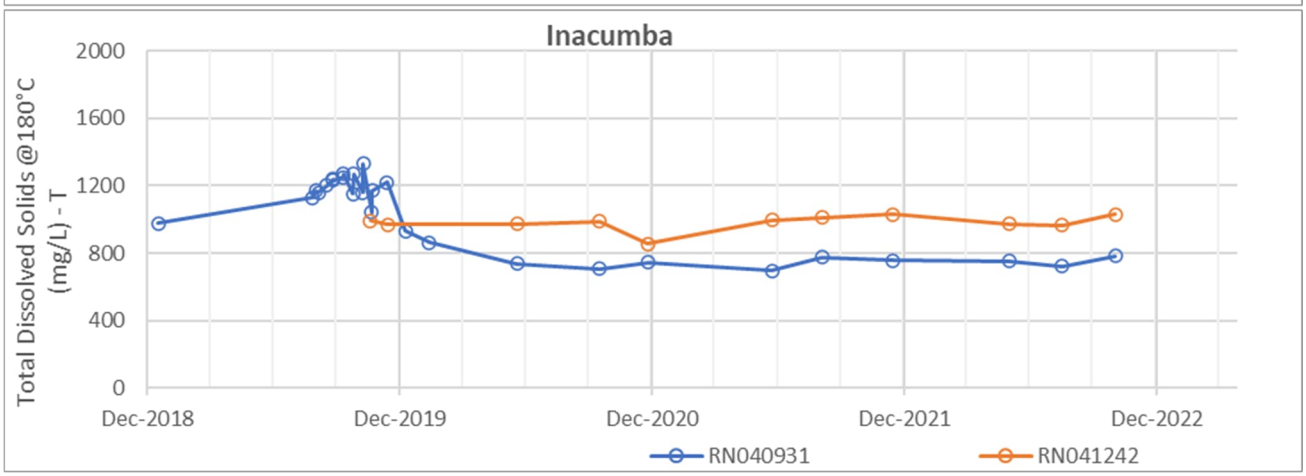

Jibera South
Electrical Conductivity @ 25°C (µS/cm) - N
2000
1600
1200
800
400
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938

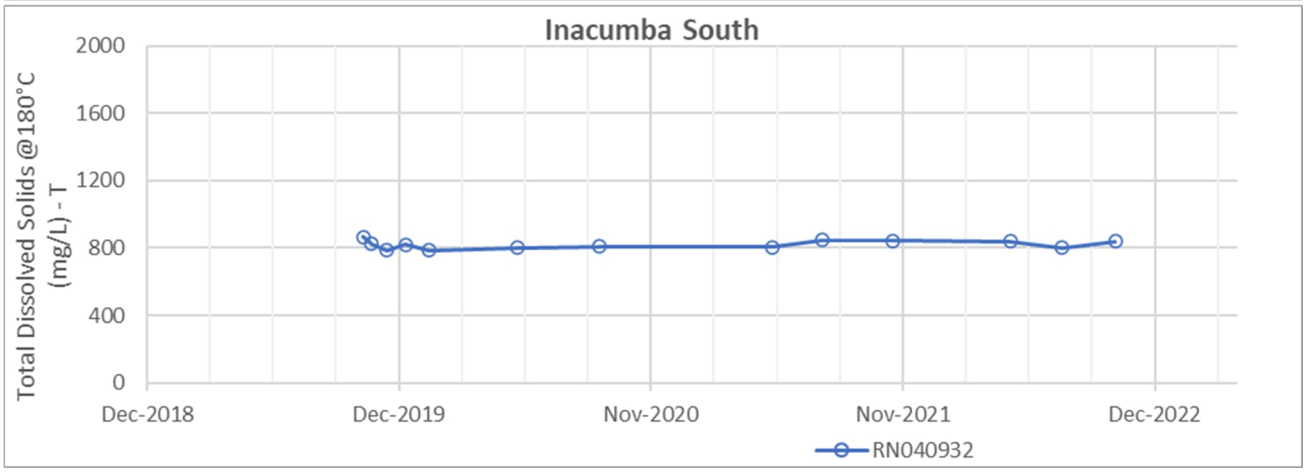

Inacumba
Electrical Conductivity @ 25°C (µS/cm) - N
2000
1600
1200
800
400
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242

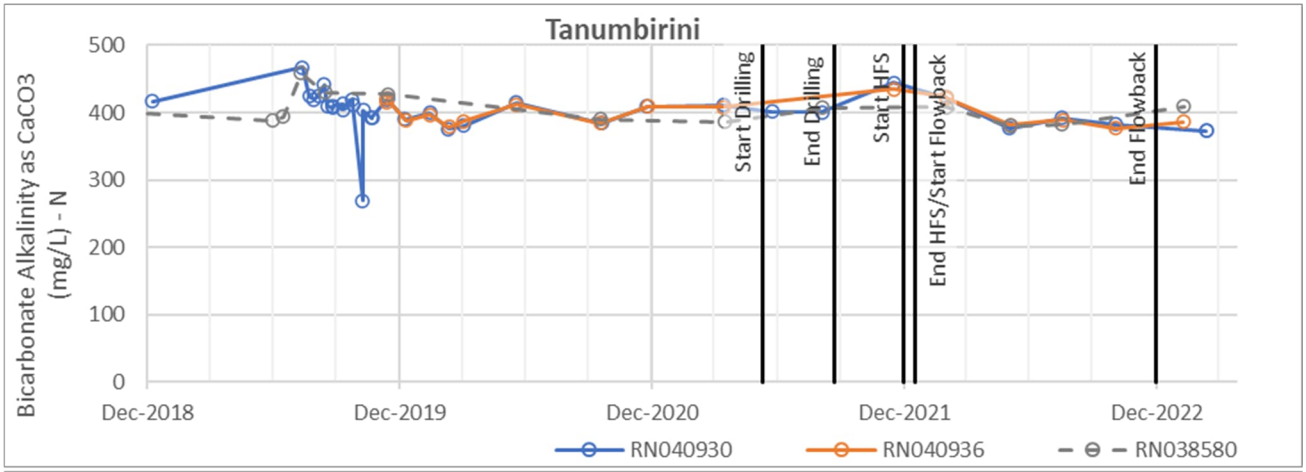

Inacumba South
Electrical Conductivity @ 25°C (µS/cm) - N
2000
1600
1200
800
400
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932

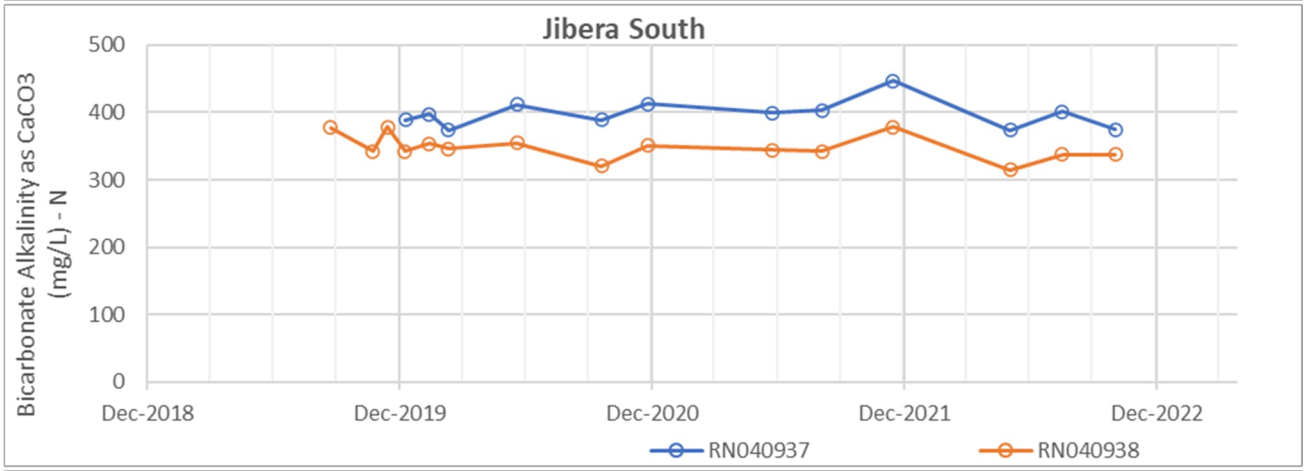

Tanumbirini
Total Dissolved Solids @180°C (mg/L) - T
2000
1600
1200
800
400
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
RN040936
RN038580

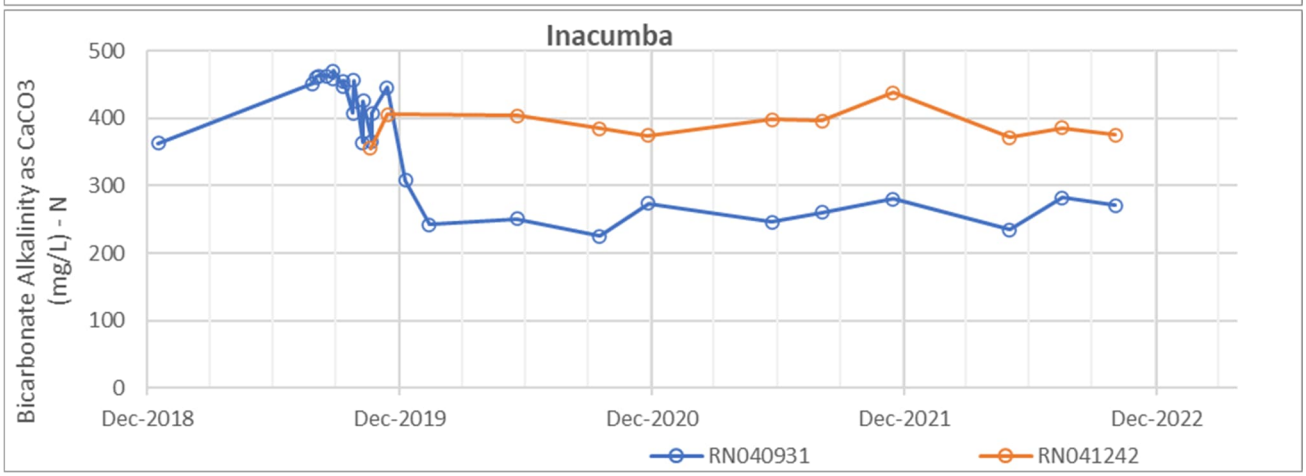

Jibera South
Total Dissolved Solids @180°C (mg/L) - T
2000
1600
1200
800
400
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938

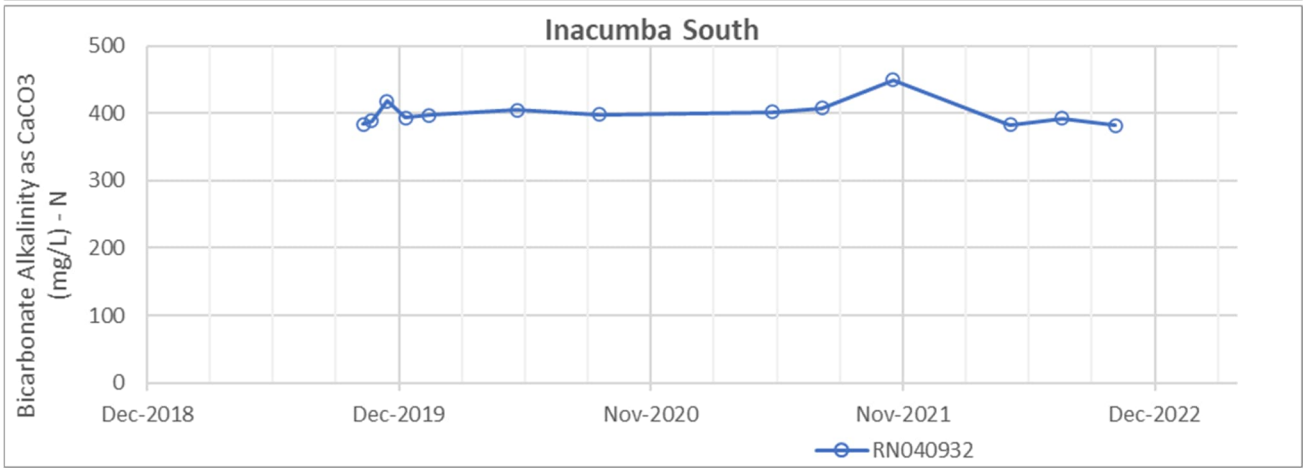

Inacumba
Total Dissolved Solids @180°C (mg/L) - T
2000
1600
1200
800
400
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242

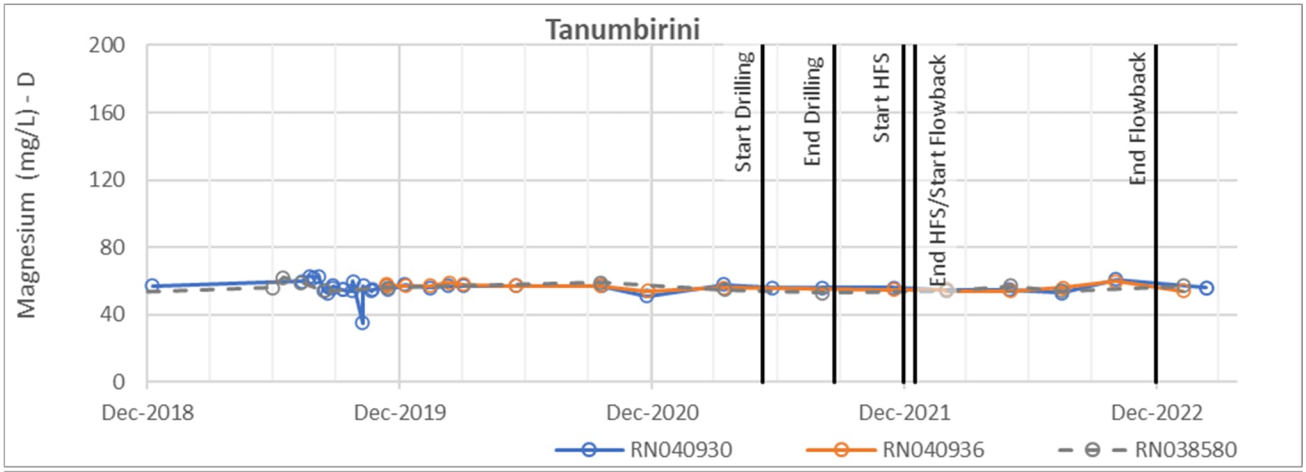

Inacumba South
Total Dissolved Solids @180°C (mg/L) - T
2000
1600
1200
800
400
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932

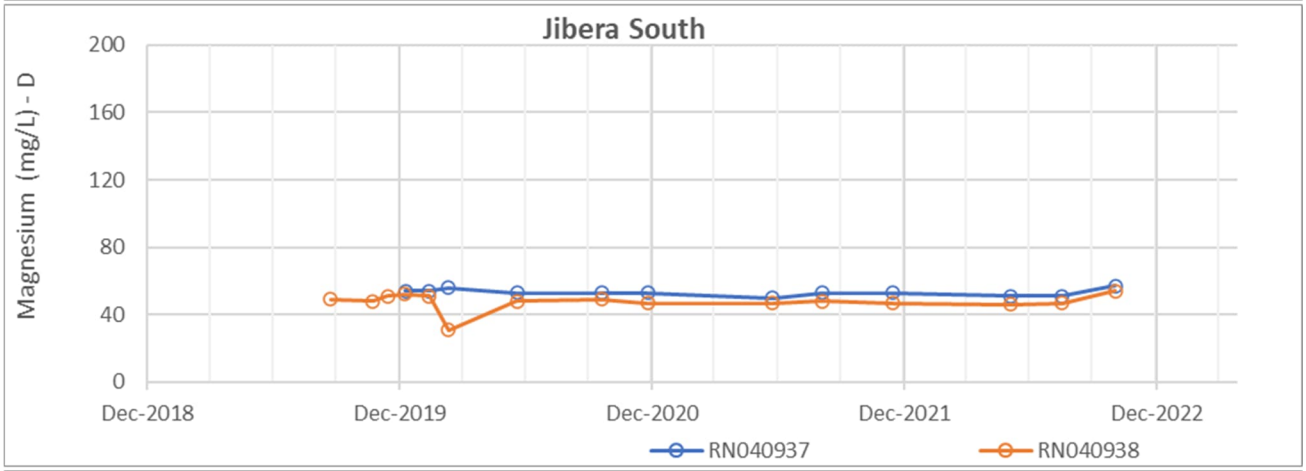

Tanumbirini
Bicarbonate Alkalinity as CaCO3 (mg/L) - N
500
400
300
200
100
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
RN040930
RN040936
RN038580

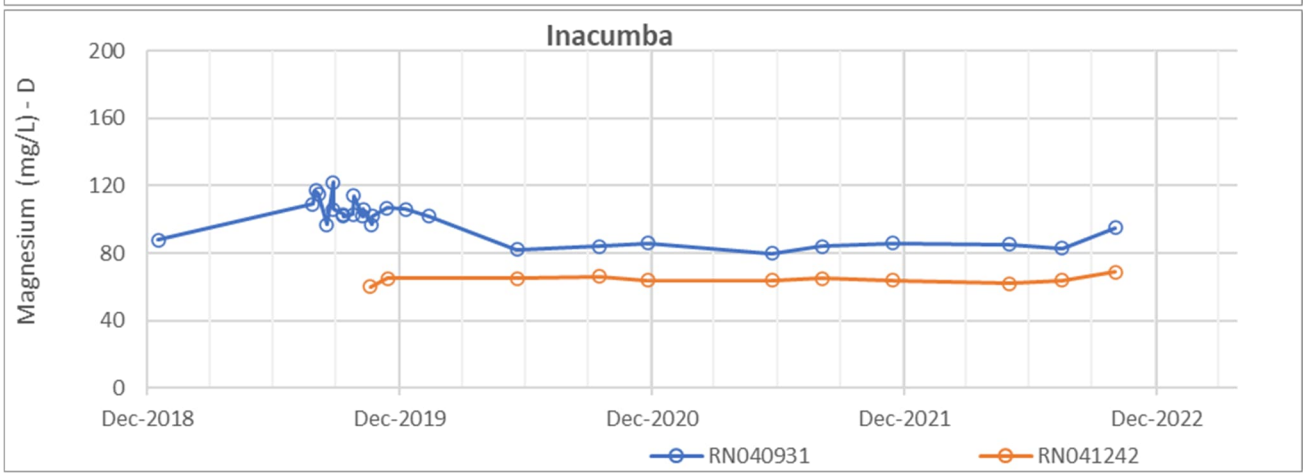

Jibera South
Bicarbonate Alkalinity as CaCO3 (mg/L) - N
500
400
300
200
100
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938

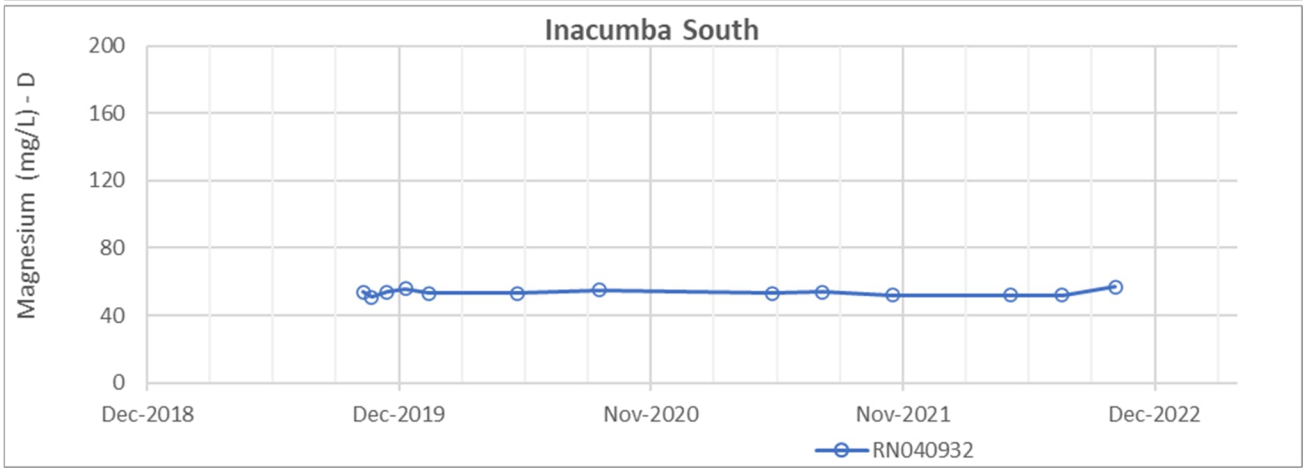

Inacumba
Bicarbonate Alkalinity as CaCO3 (mg/L) - N
500
400
300
200
100
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242

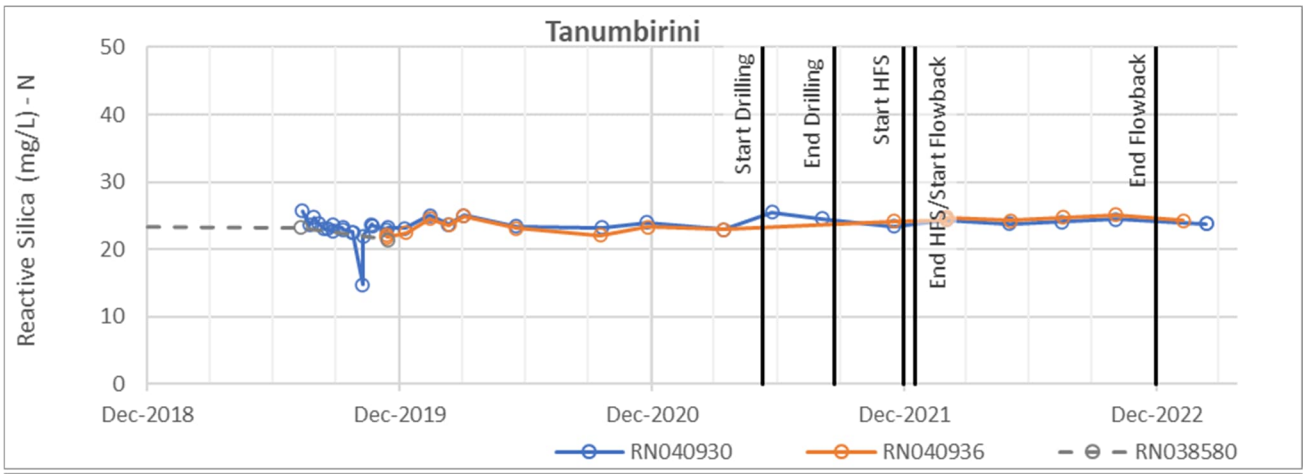

Inacumba South
Bicarbonate Alkalinity as CaCO3 (mg/L) - N
500
400
300
200
100
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932

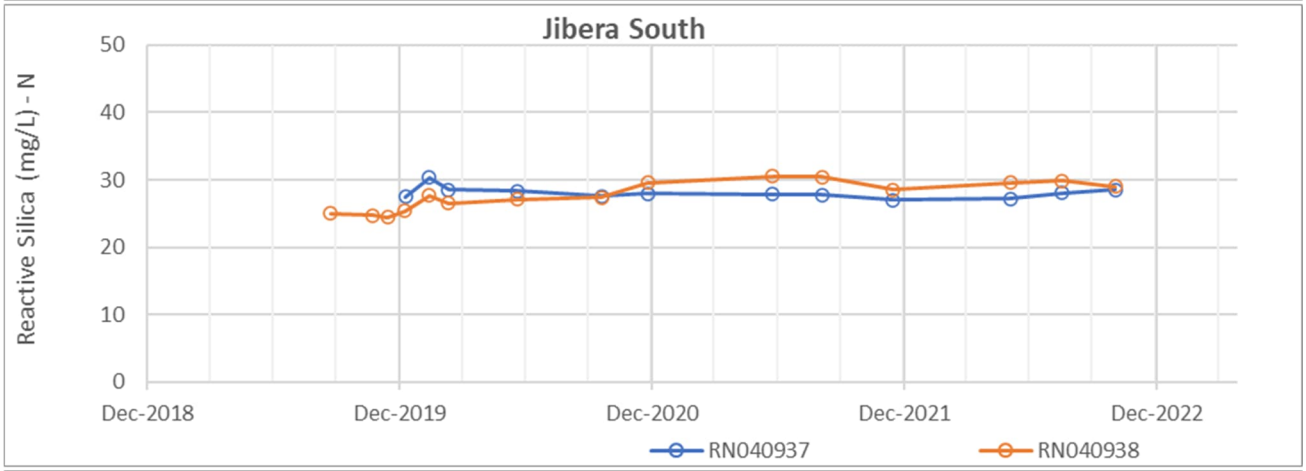

Tanumbirini
Magnesium (mg/L) - D
200
160
120
80
40
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
RN040936
RN038580

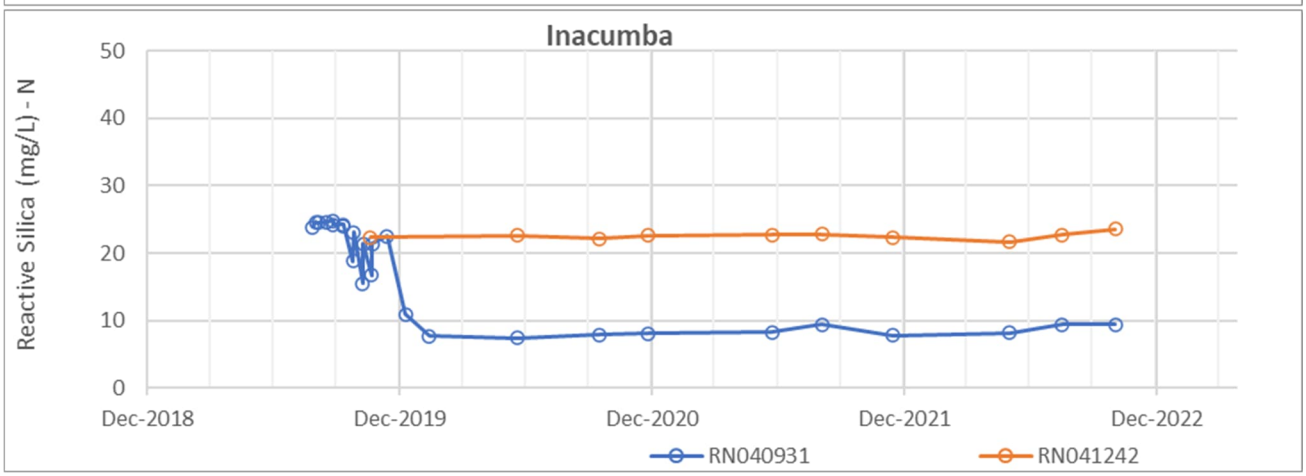

Jibera South
Magnesium (mg/L) - D
200
160
120
80
40
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938

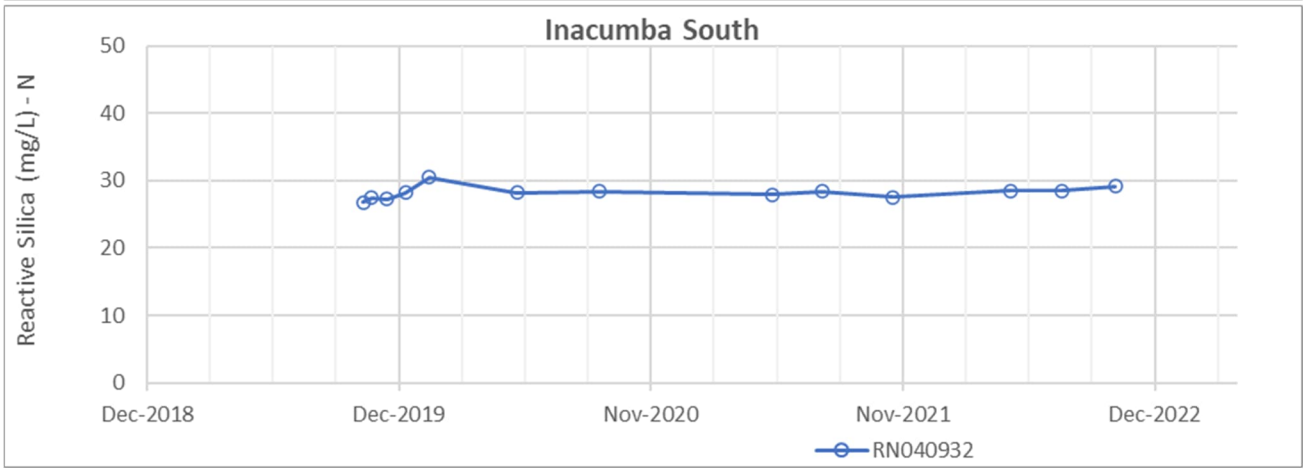

Inacumba
Magnesium (mg/L) - D
200
160
120
80
40
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242

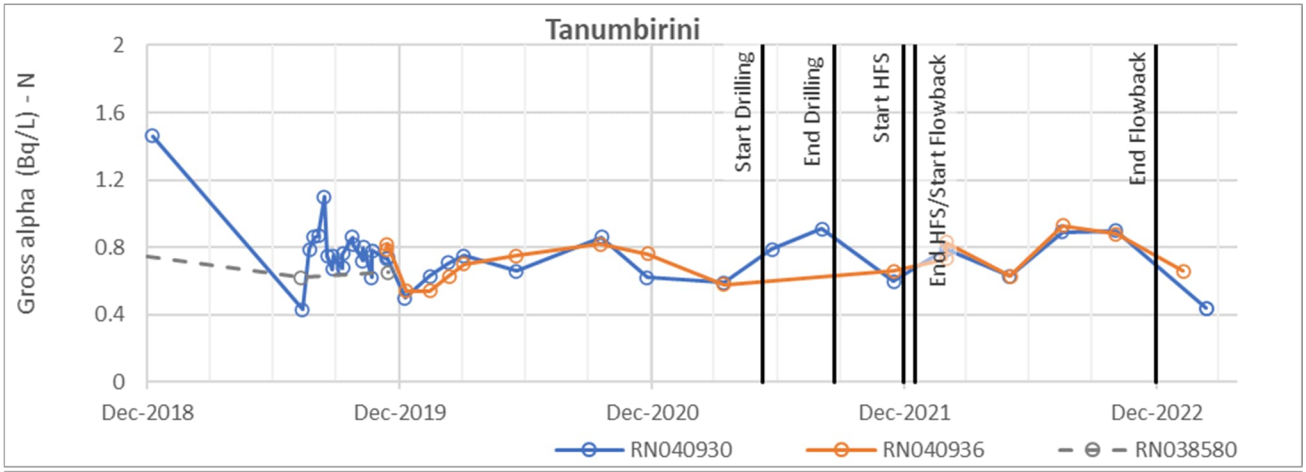

Inacumba South
Magnesium (mg/L) - D
200
160
120
80
40
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932


Tanumbirini
Reactive Silica (mg/L) - N
50
40
30
20
10
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
RN040936
RN038580


Jibera South
Reactive Silica (mg/L) - N
50
40
30
20
10
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938


Inacumba
Reactive Silica (mg/L) - N
50
40
30
20
10
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242


Inacumba South
Reactive Silica (mg/L) - N
50
40
30
20
10
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932


Tanumbirini
Gross alpha (Bq/L) - N
2
1.6
1.2
0.8
0.4
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
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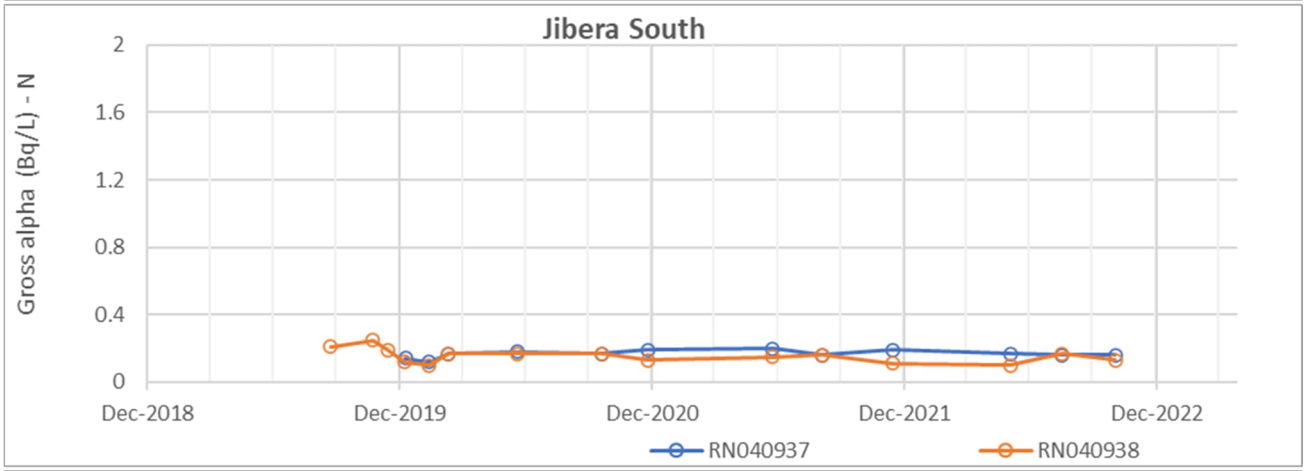
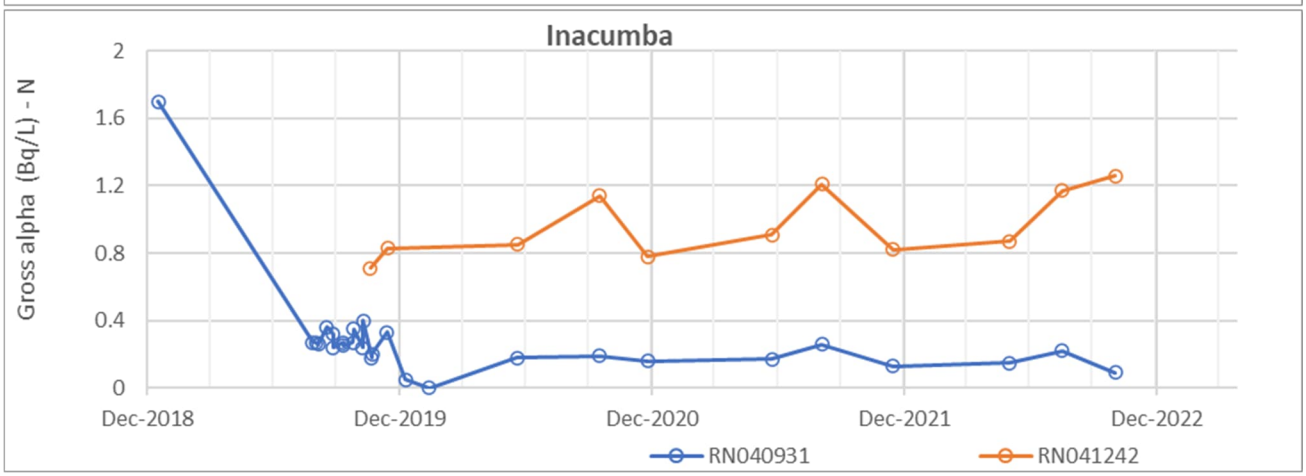
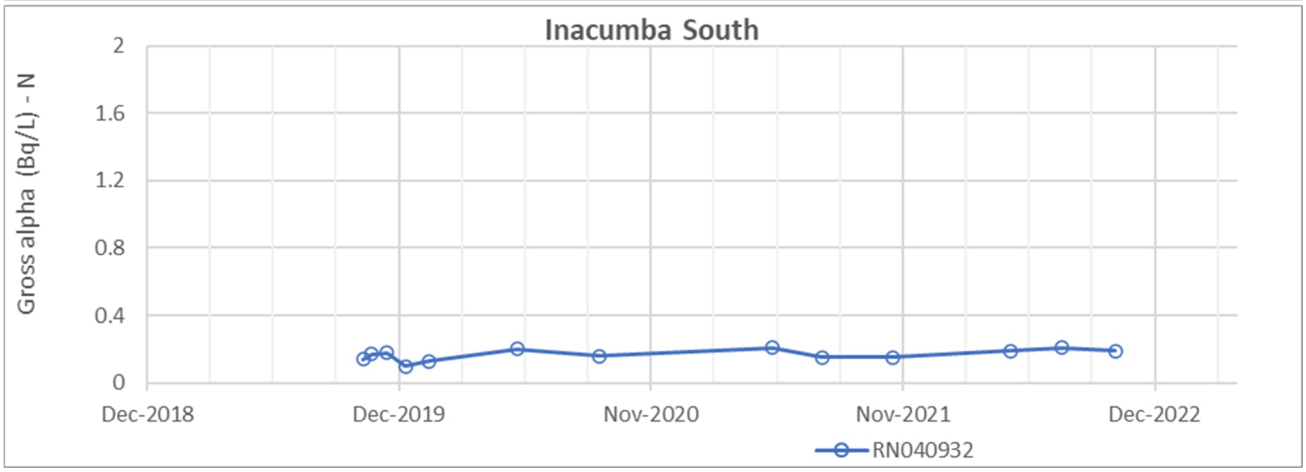
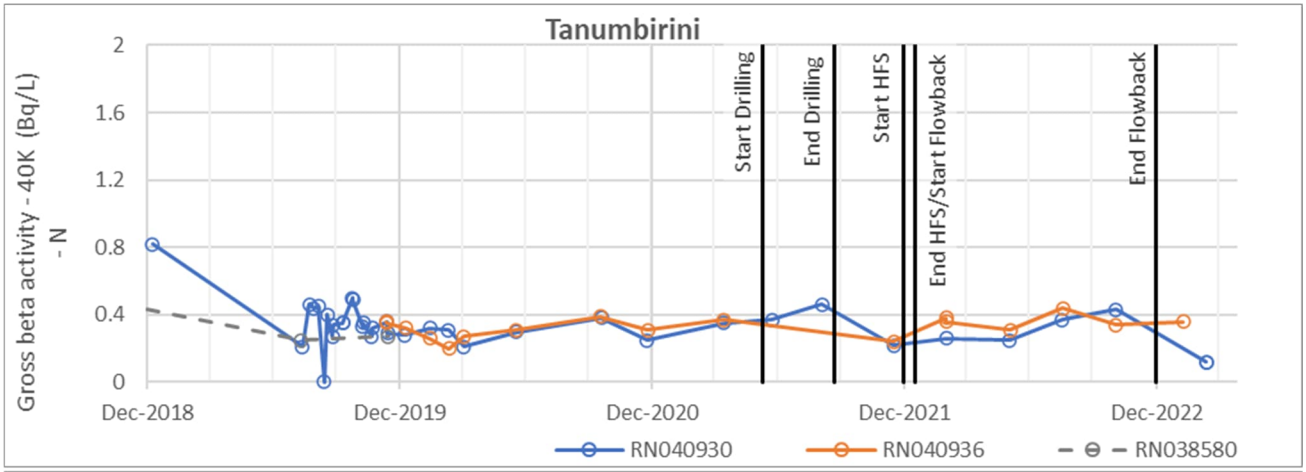

Jibera South
Gross alpha (Bq/L) - N
2
1.6
1.2
0.8
0.4
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938


Inacumba
Gross alpha (Bq/L) - N
2
1.6
1.2
0.8
0.4
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242


Inacumba South
Gross alpha (Bq/L) - N
2
1.6
1.2
0.8
0.4
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932


Tanumbirini
Gross beta activity - 40K (Bq/L) - N
2
1.6
1.2
0.8
0.4
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
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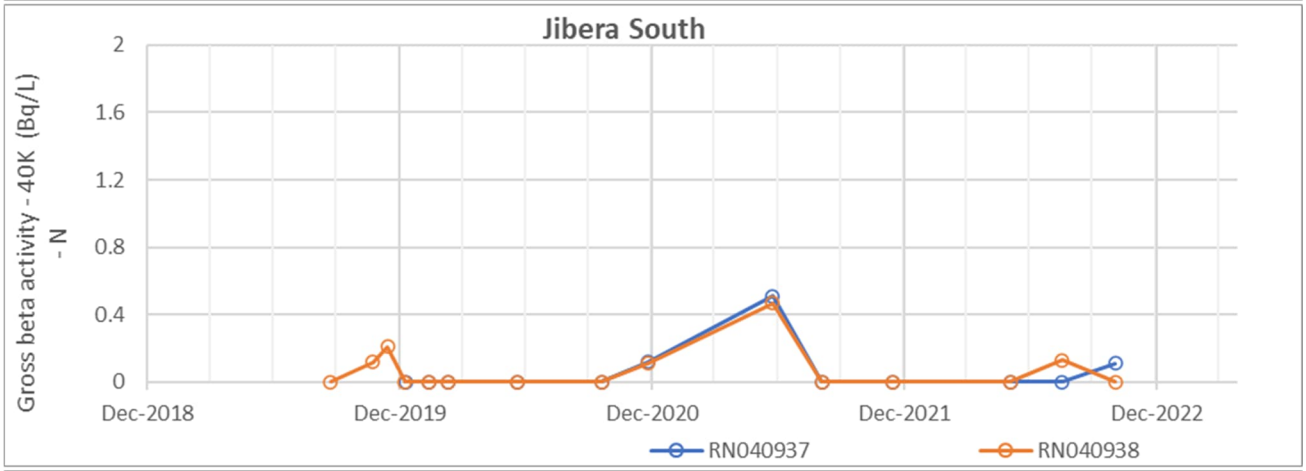
Jibera South
Gross beta activity - 40K (Bq/L) - N
2
1.6
1.2
0.8
0.4
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
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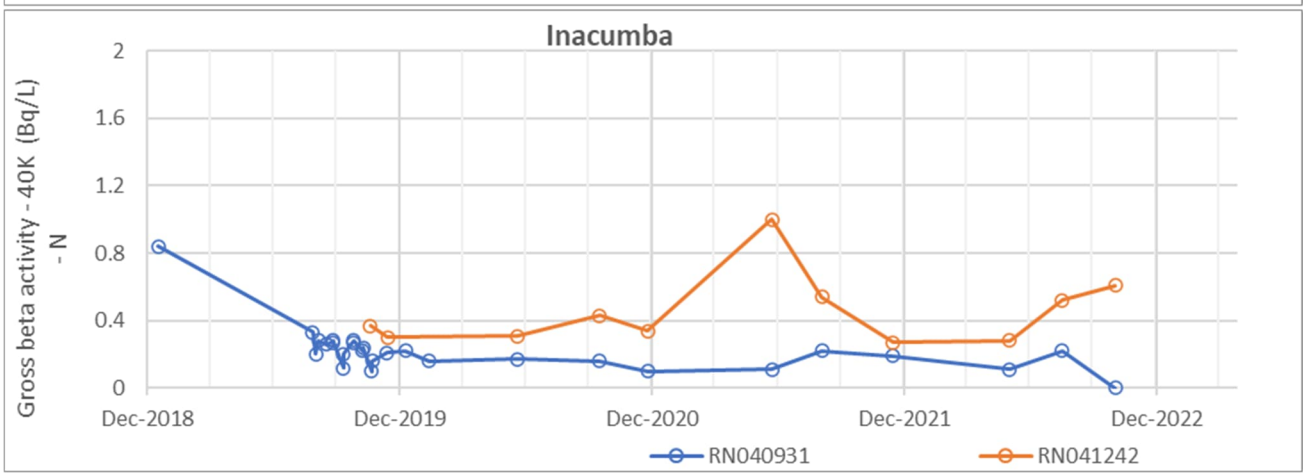
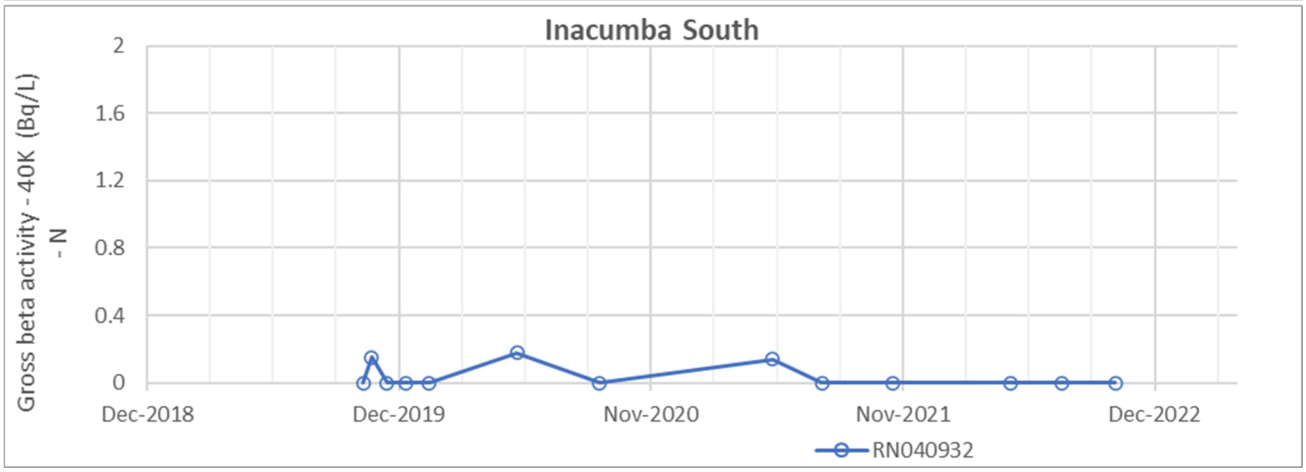
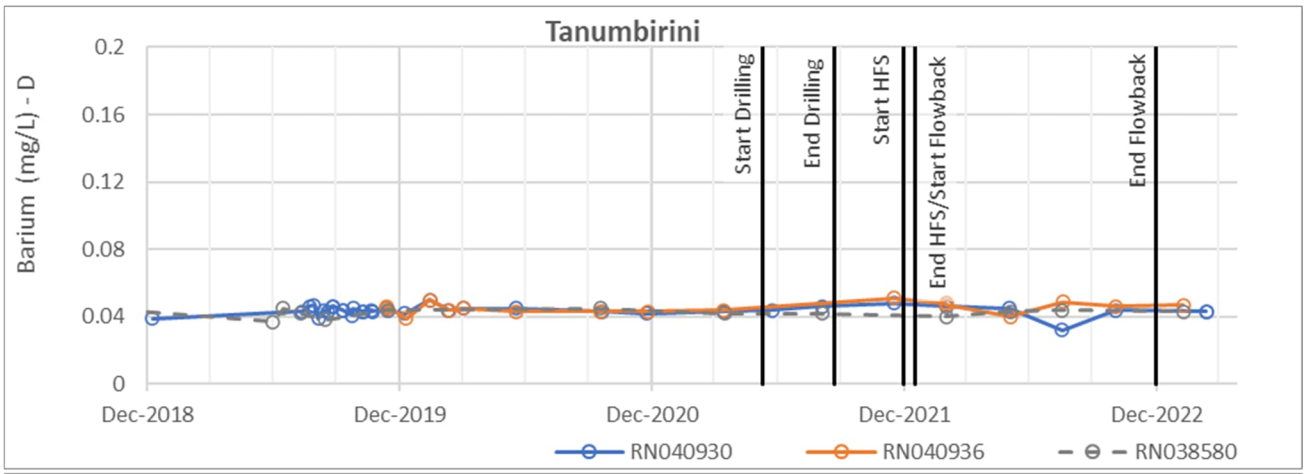

Inacumba
Gross beta activity - 40K (Bq/L) - N
2
1.6
1.2
0.8
0.4
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242


Inacumba South
Gross beta activity - 40K (Bq/L) - N
2
1.6
1.2
0.8
0.4
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932


Tanumbirini
Barium (mg/L) - D
0.2
0.16
0.12
0.08
0.04
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
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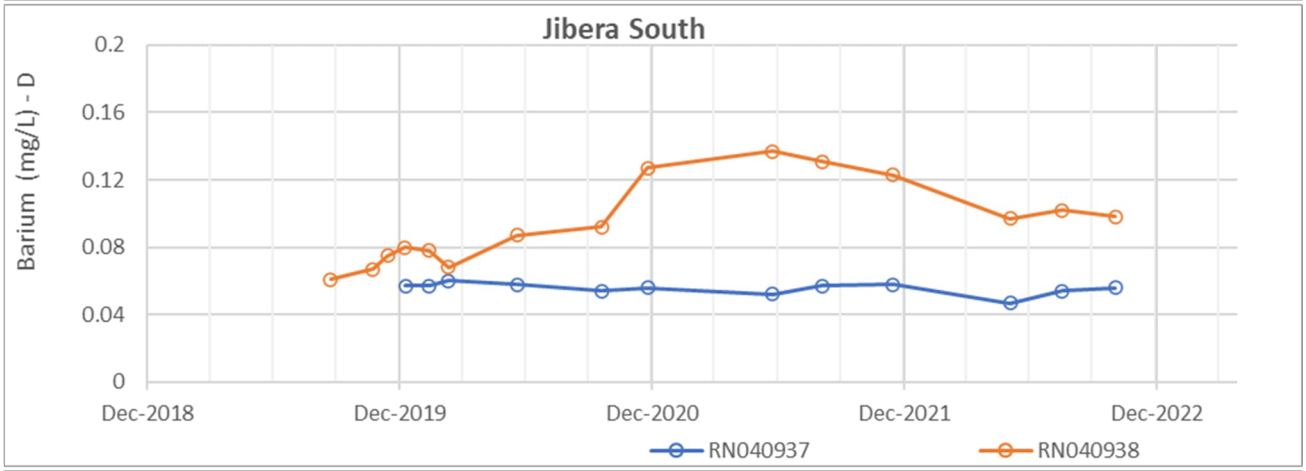
Jibera South
Barium (mg/L) - D
0.2
0.16
0.12
0.08
0.04
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
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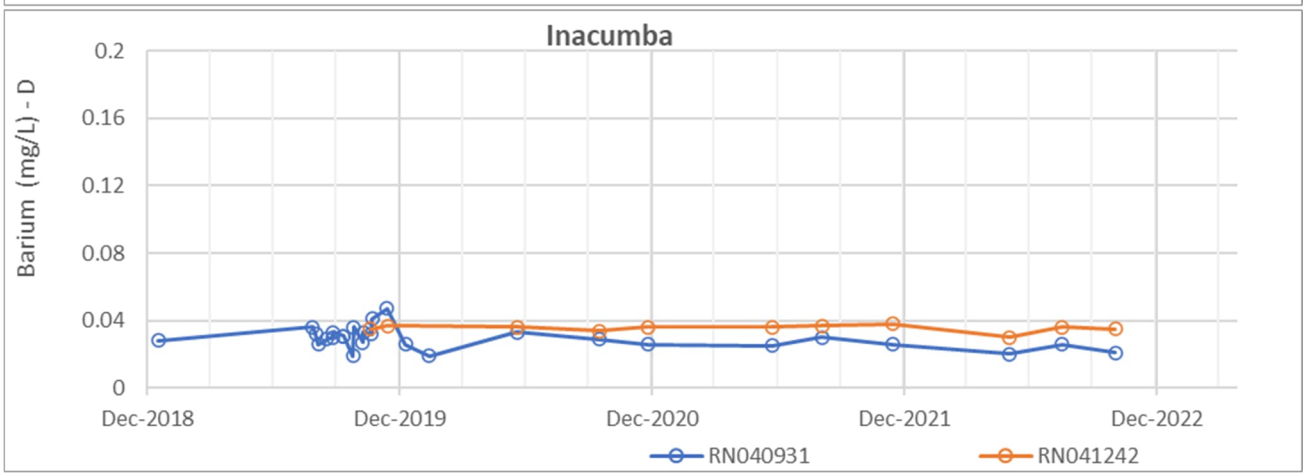
Inacumba
Barium (mg/L) - D
0.2
0.16
0.12
0.08
0.04
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
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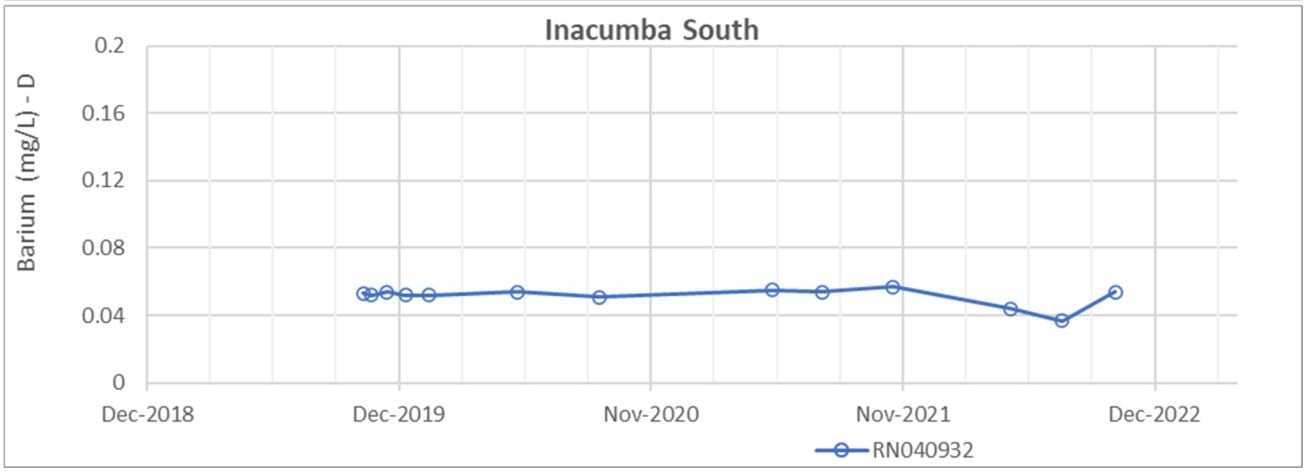
Inacumba South
Barium (mg/L) - D
0.2
0.16
0.12
0.08
0.04
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
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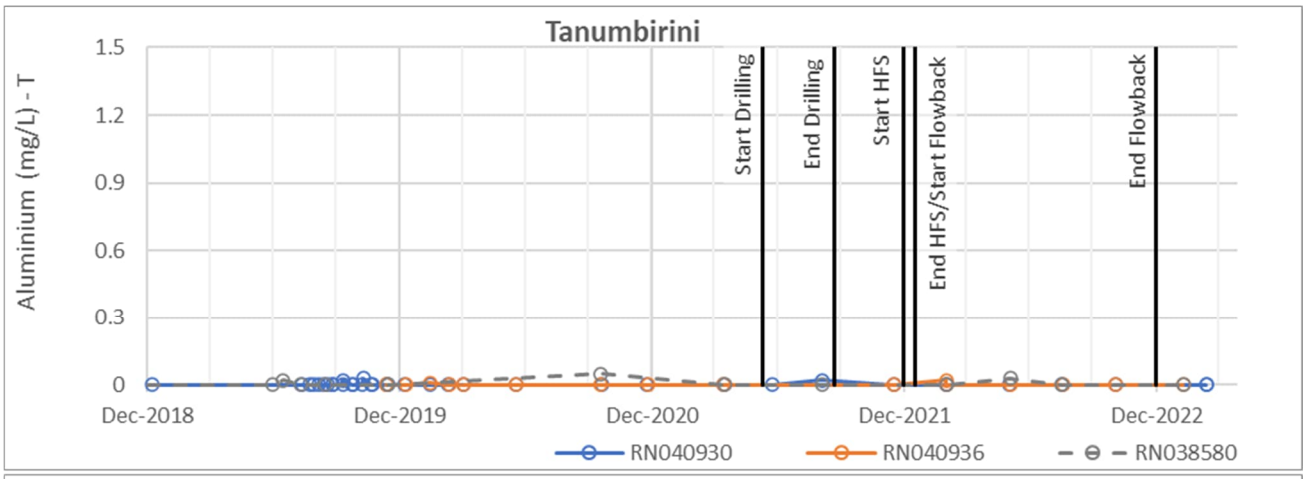
RN040932


Tanumbirini
Aluminium (mg/L) - T
1.5
1.2
0.9
0.6
0.3
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
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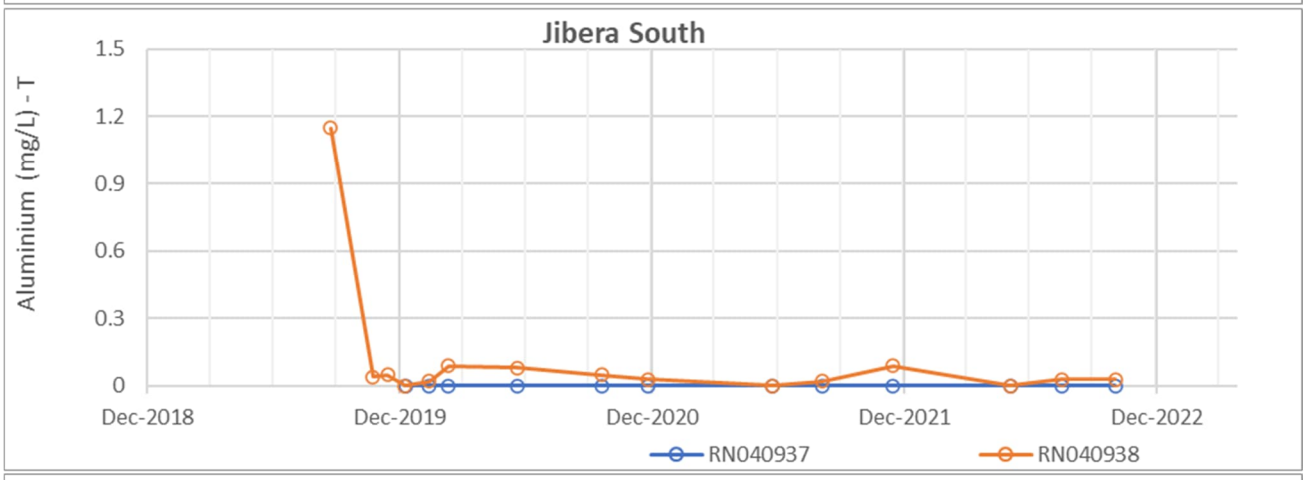
Jibera South
Aluminium (mg/L) - T
1.5
1.2
0.9
0.6
0.3
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
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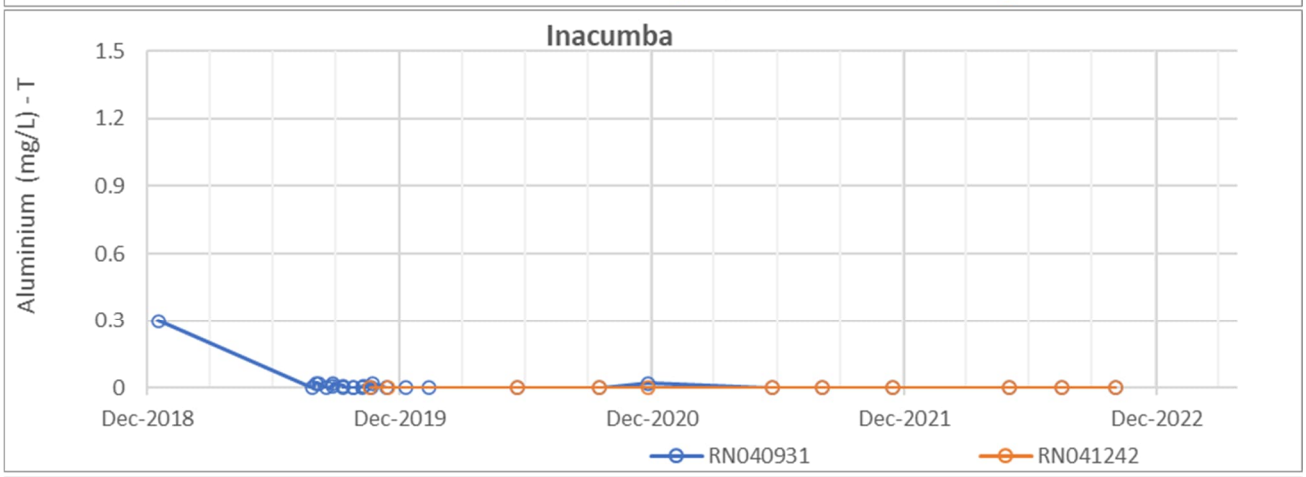
Inacumba
Aluminium (mg/L) - T
1.5
1.2
0.9
0.6
0.3
0
Dec-2018
Dec-2019
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Dec-2021
Dec-2022
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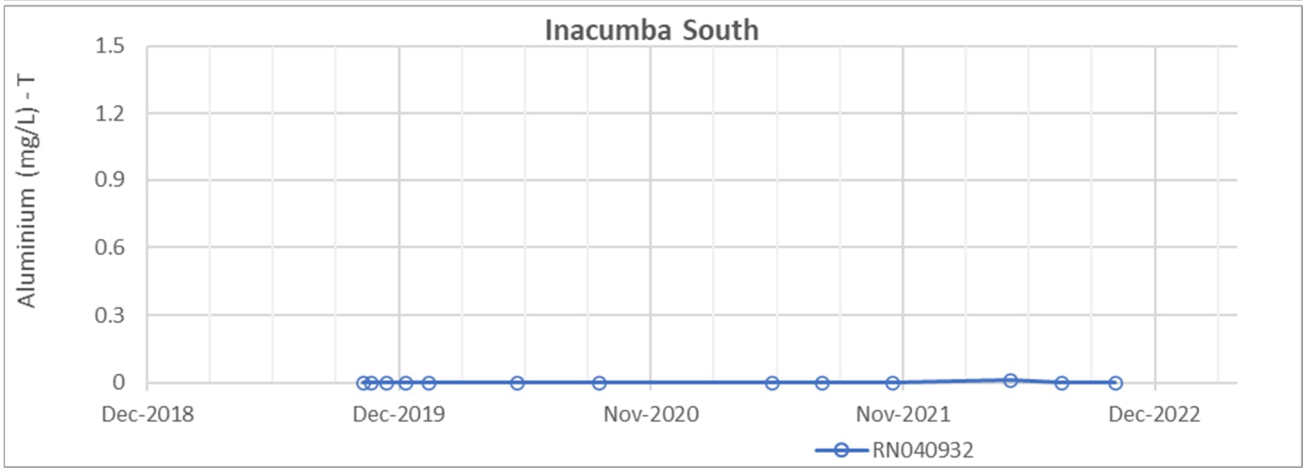
Inacumba South
Aluminium (mg/L) - T
1.5
1.2
0.9
0.6
0.3
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
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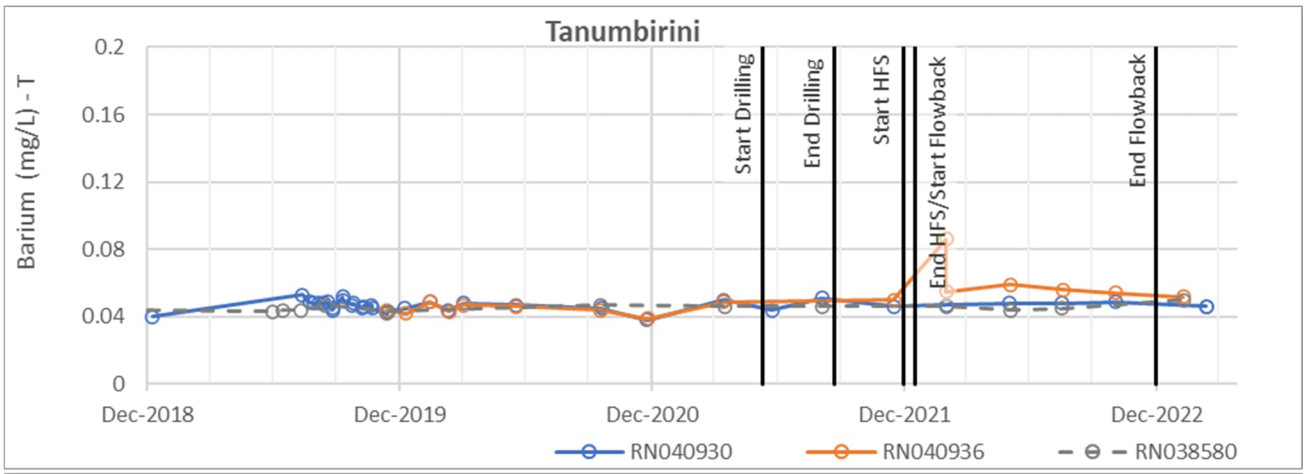
Tanumbirini
Barium (mg/L) - T
0.2
0.16
0.12
0.08
0.04
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
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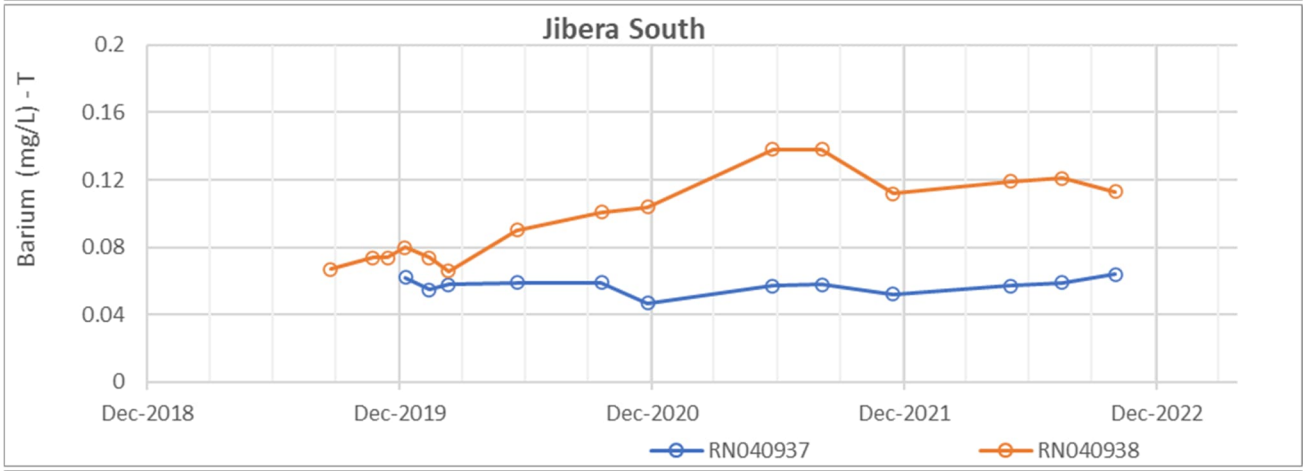
Jibera South
Barium (mg/L) - T
0.2
0.16
0.12
0.08
0.04
0
Dec-2018
Dec-2019
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Dec-2021
Dec-2022
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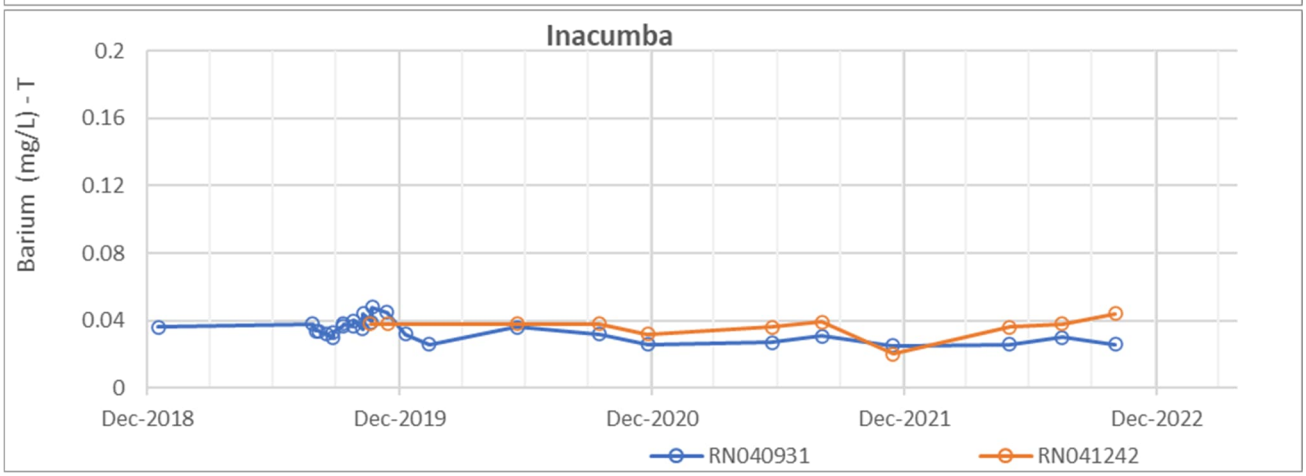
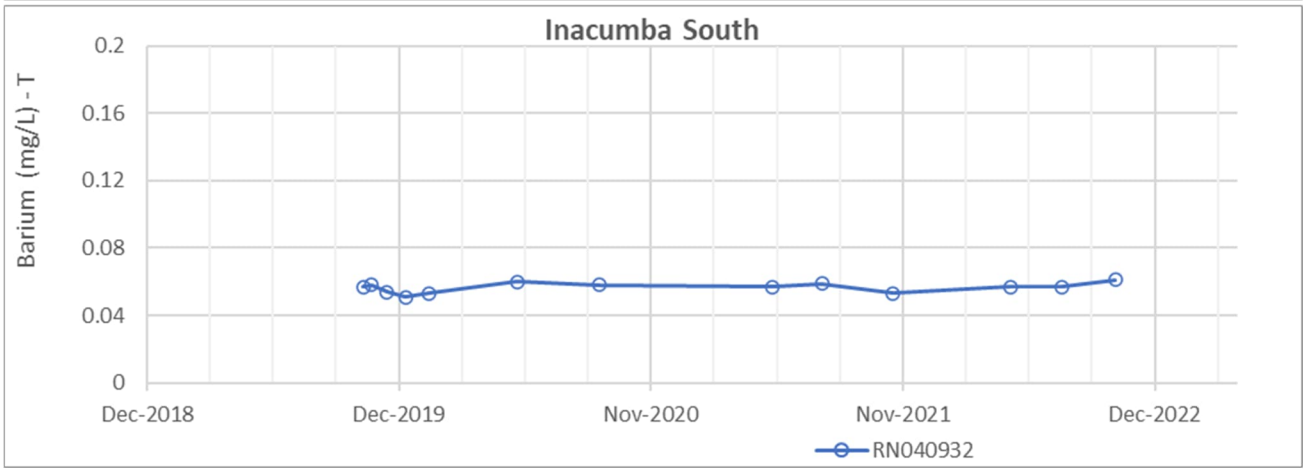
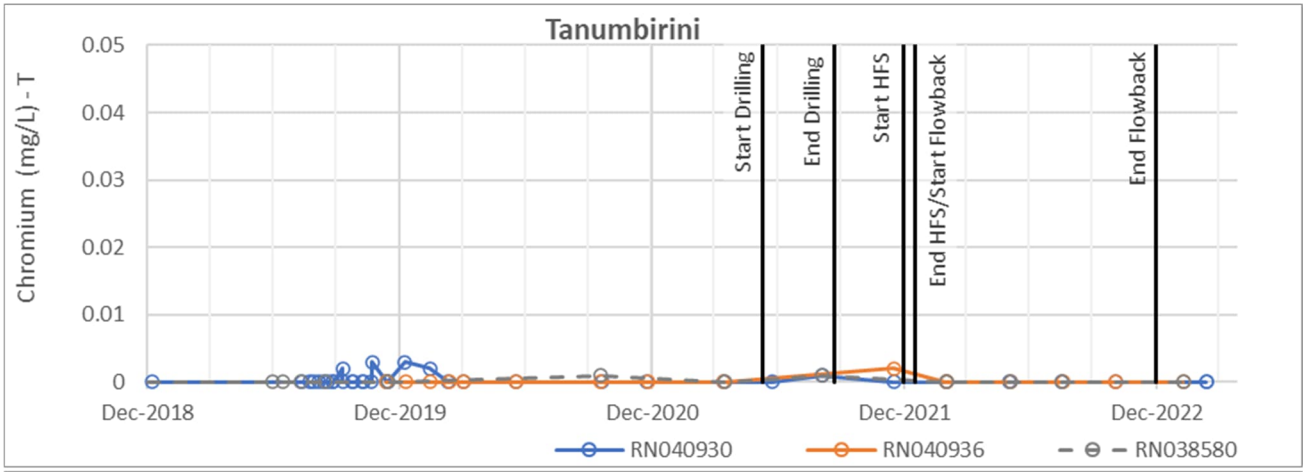

Inacumba
Barium (mg/L) - T
0.2
0.16
0.12
0.08
0.04
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242


Inacumba South
Barium (mg/L) - T
0.2
0.16
0.12
0.08
0.04
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932


Tanumbirini
Chromium (mg/L) - T
0.05
0.04
0.03
0.02
0.01
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
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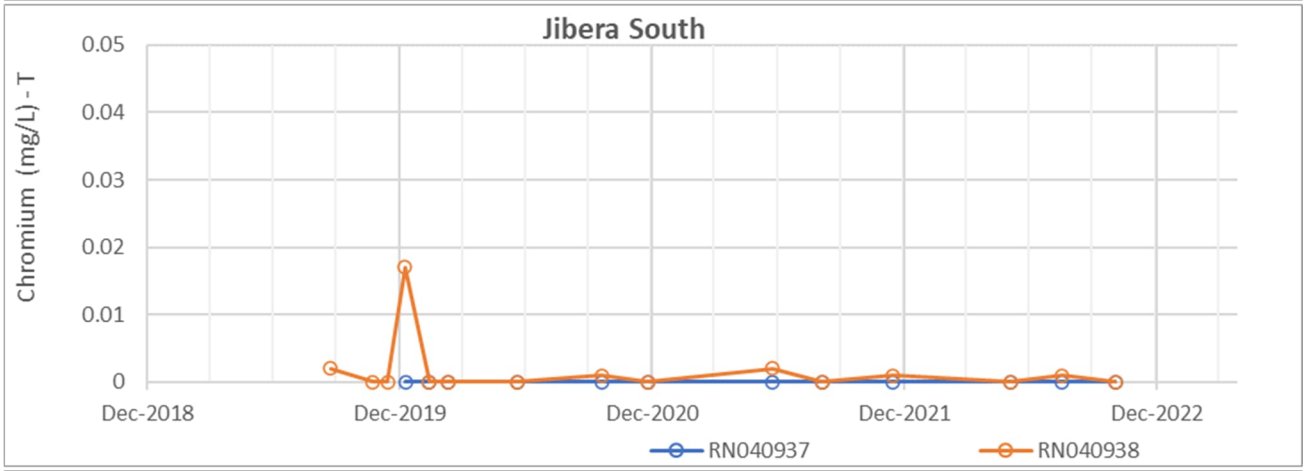
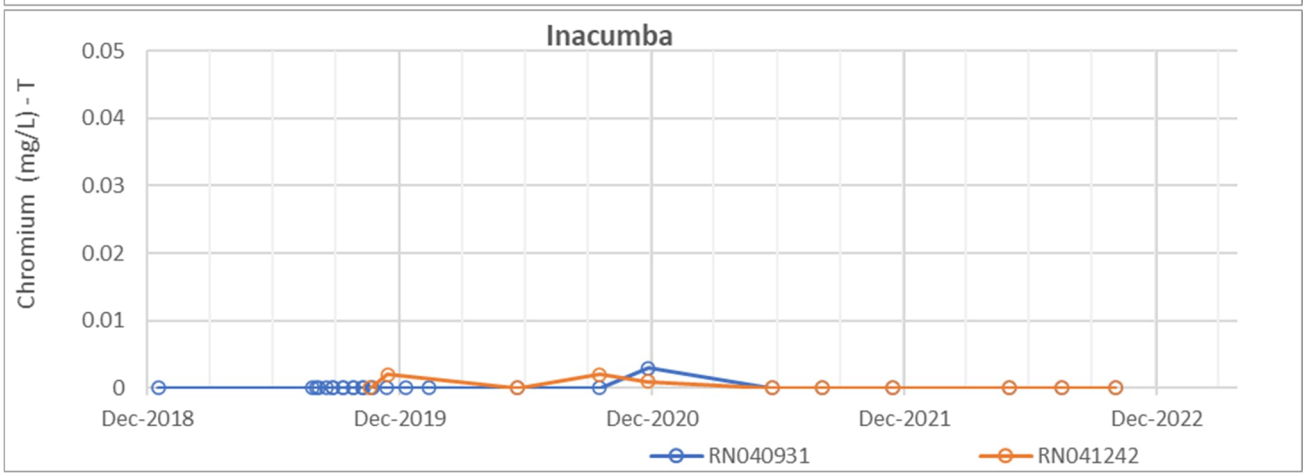
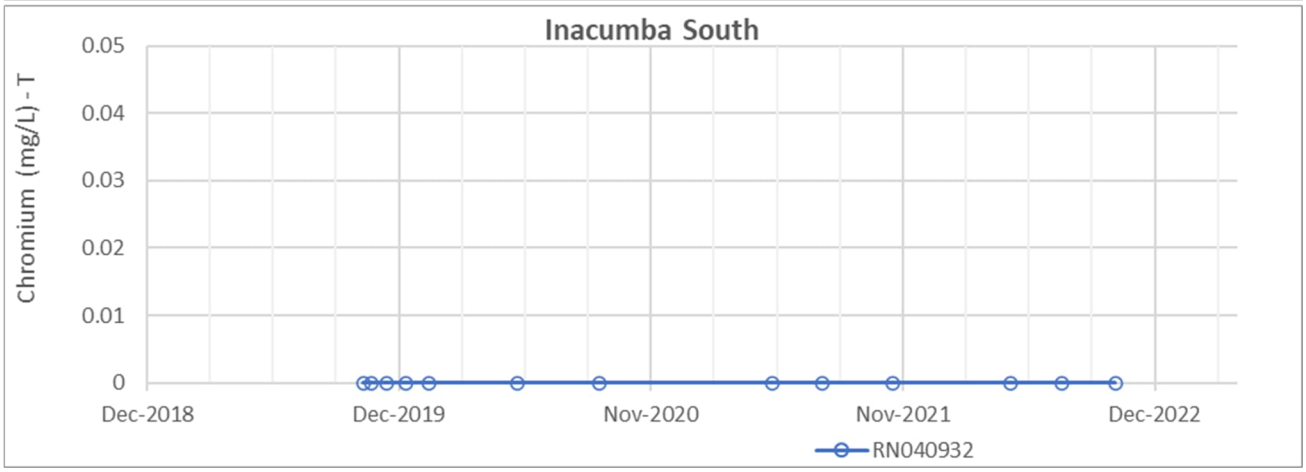
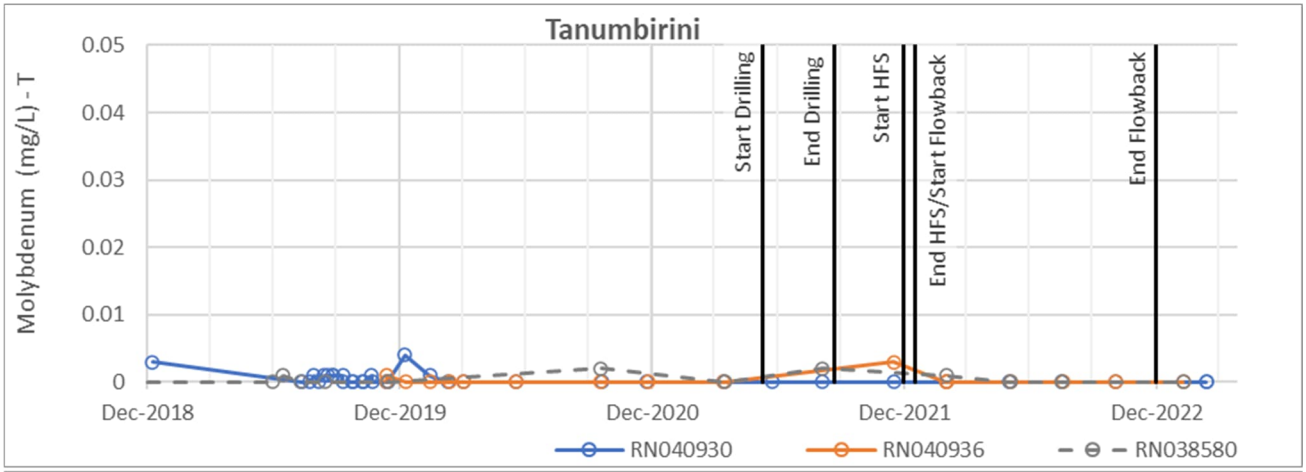

Jibera South
Chromium (mg/L) - T
0.05
0.04
0.03
0.02
0.01
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938


Inacumba
Chromium (mg/L) - T
0.05
0.04
0.03
0.02
0.01
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242


Inacumba South
Chromium (mg/L) - T
0.05
0.04
0.03
0.02
0.01
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932


Tanumbirini
Molybdenum (mg/L) - T
0.05
0.04
0.03
0.02
0.01
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040930
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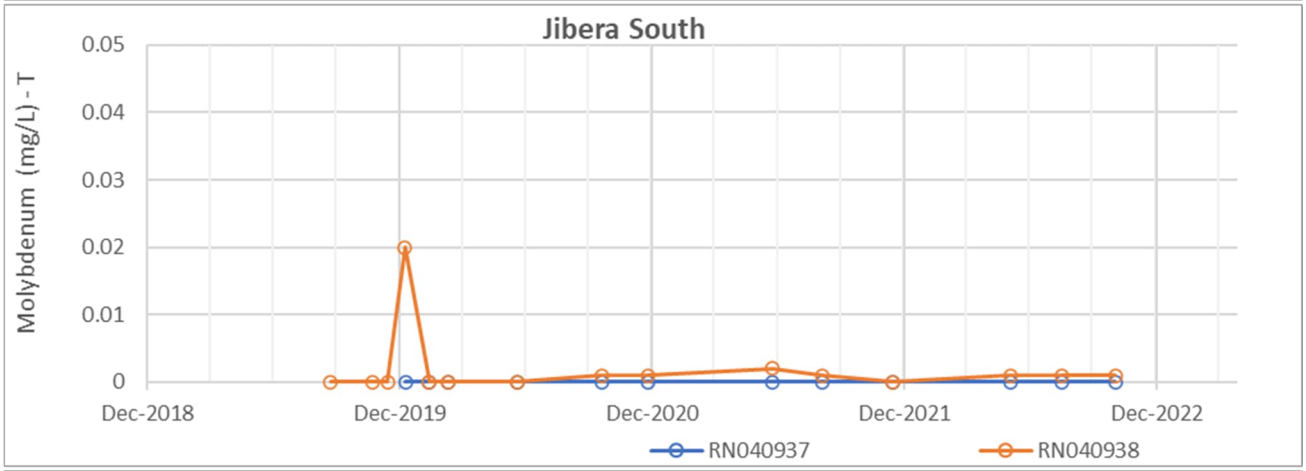
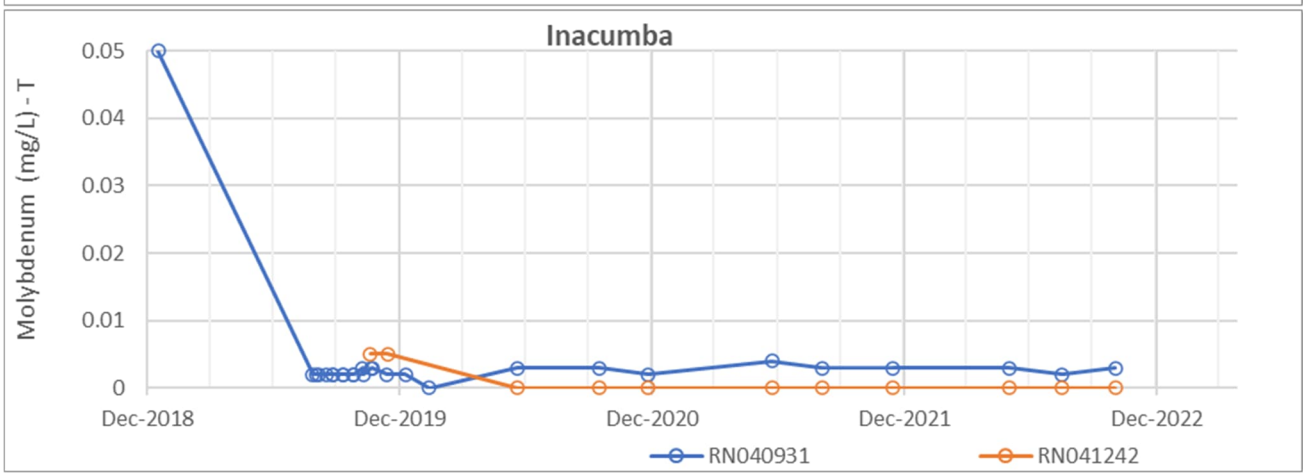
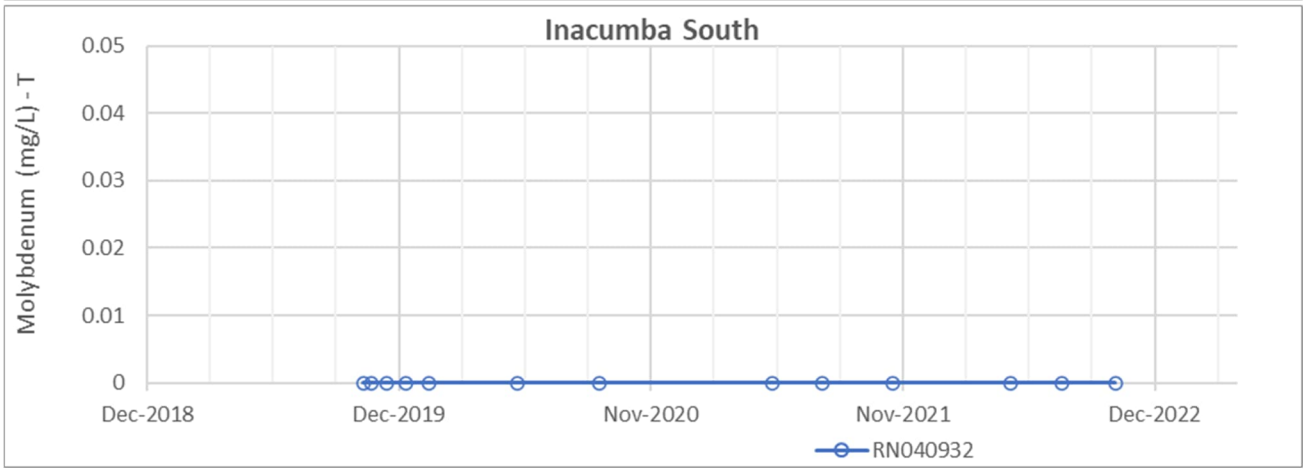
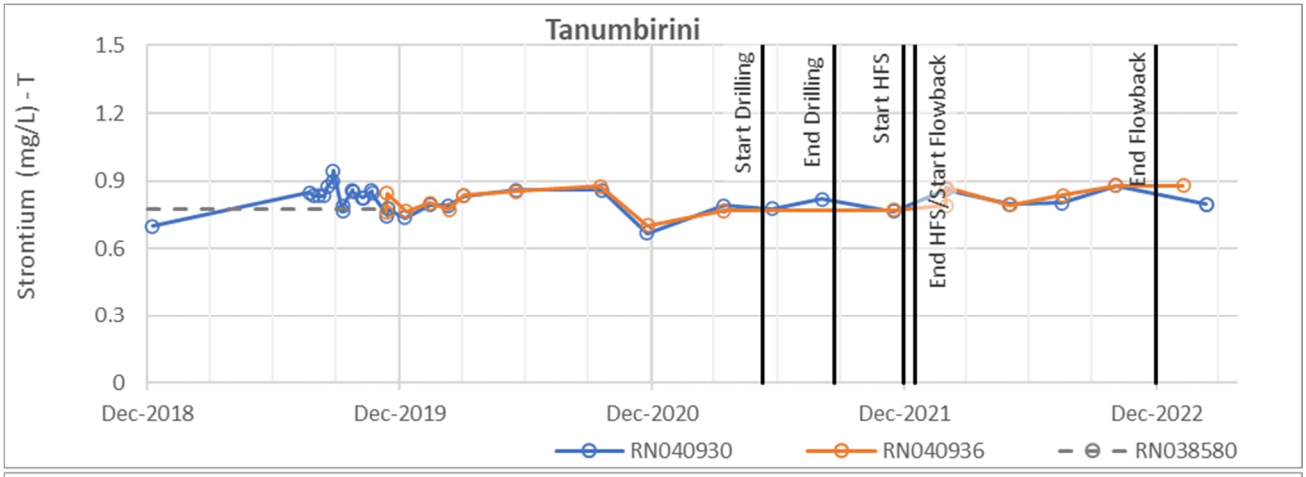
RN038580


Jibera South
Molybdenum (mg/L) - T
0.05
0.04
0.03
0.02
0.01
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938


Inacumba
Molybdenum (mg/L) - T
0.05
0.04
0.03
0.02
0.01
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242


Inacumba South
Molybdenum (mg/L) - T
0.05
0.04
0.03
0.02
0.01
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932


Tanumbirini
Strontium (mg/L) - T
1.5
1.2
0.9
0.6
0.3
0
Start Drilling
End Drilling
Start HFS
End HFS/Start Flowback
End Flowback
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
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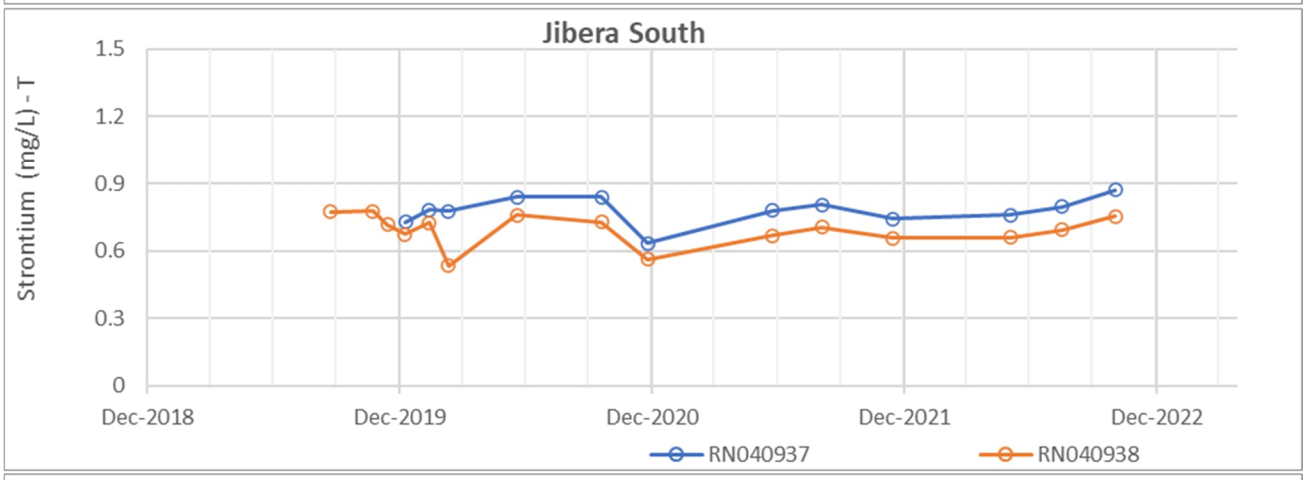
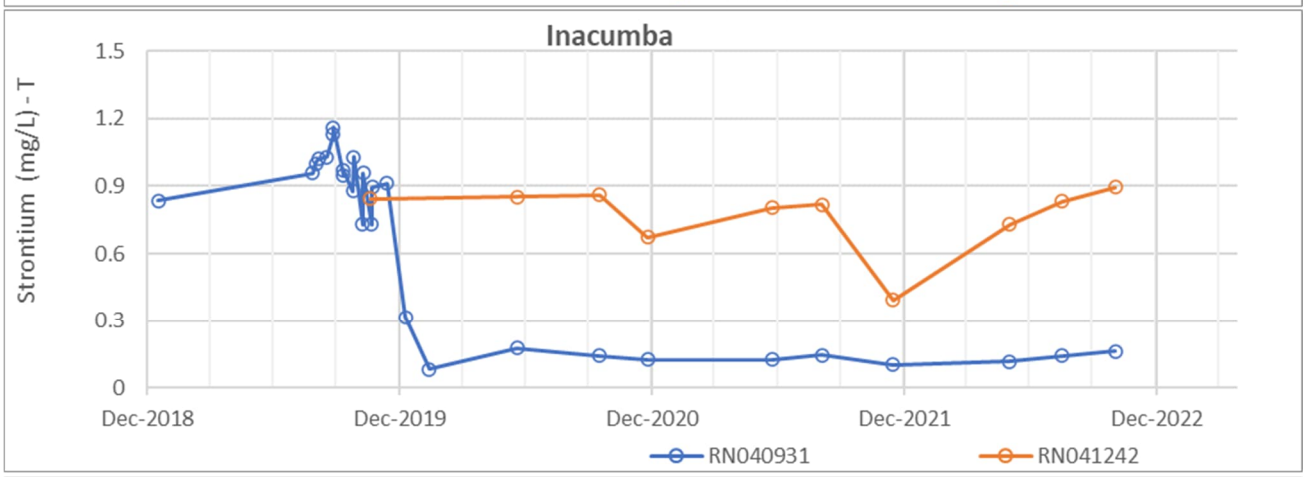
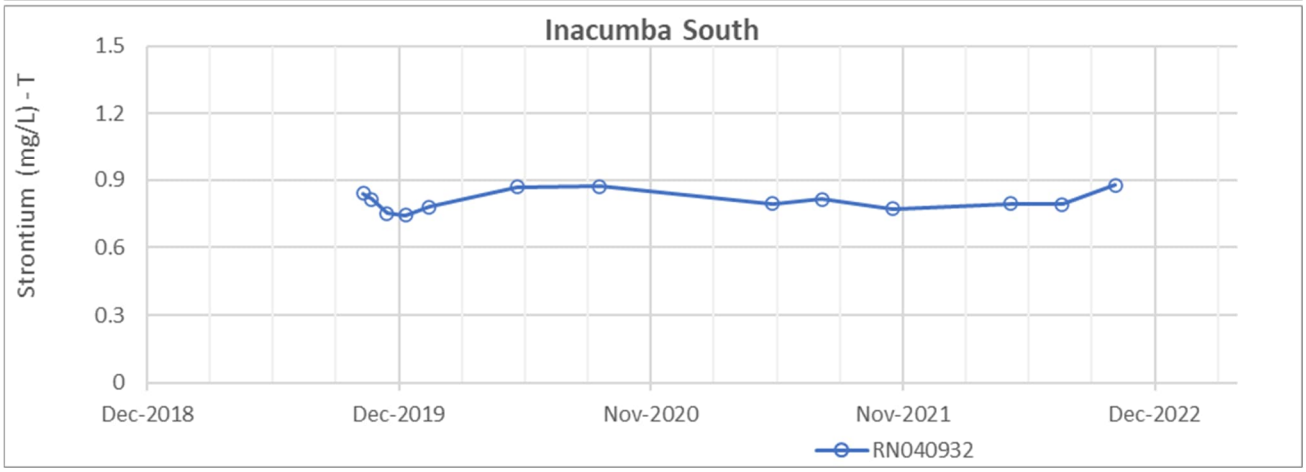
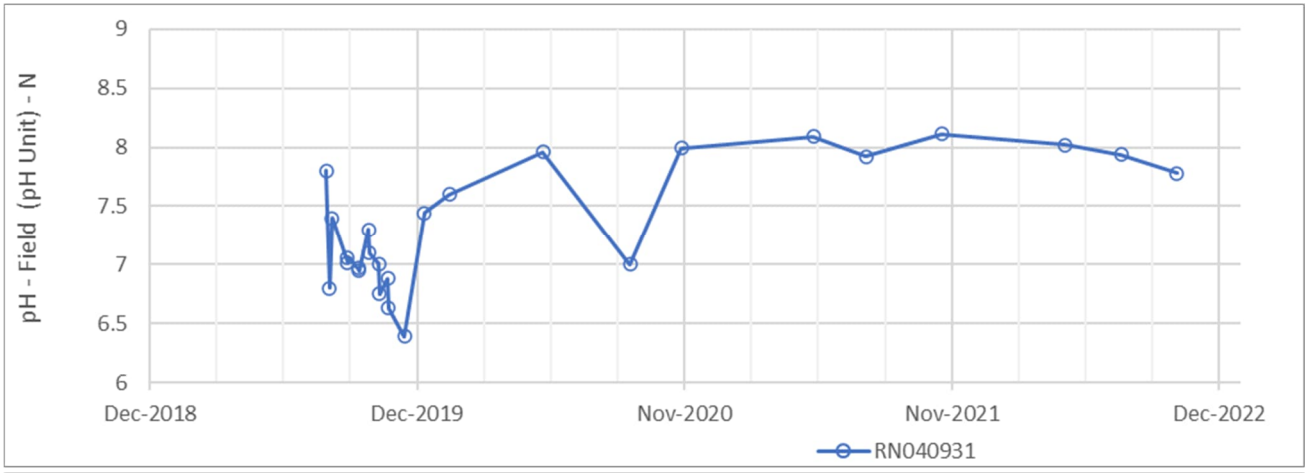
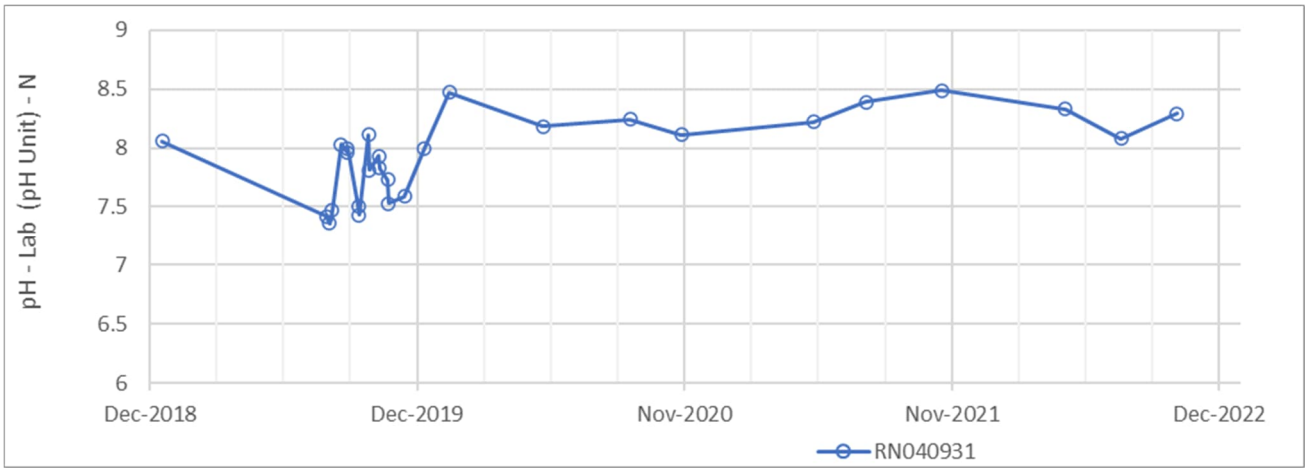

Jibera South
Strontium (mg/L) - T
1.5
1.2
0.9
0.6
0.3
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040937
RN040938

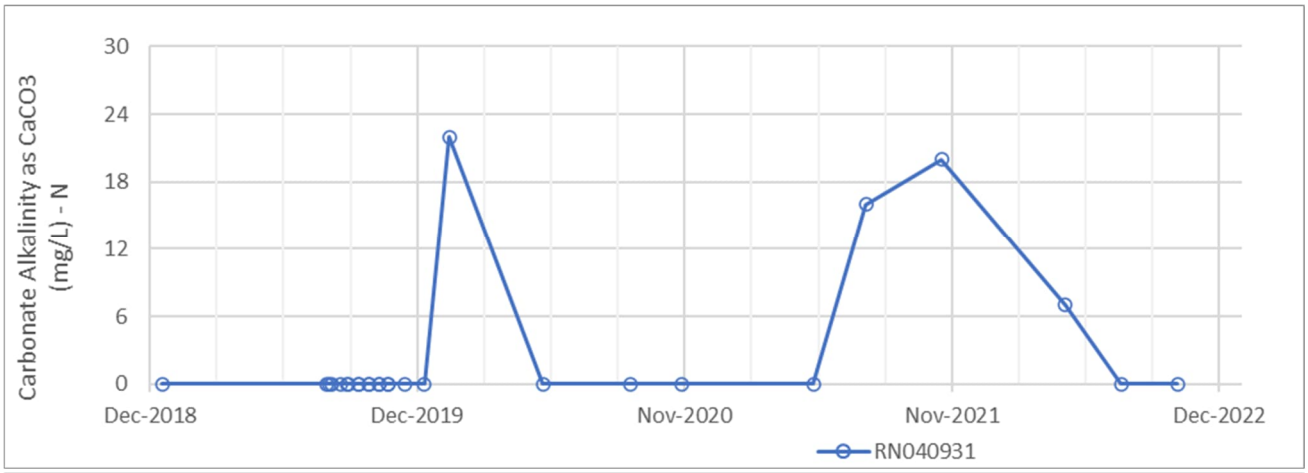

Inacumba
Strontium (mg/L) - T
1.5
1.2
0.9
0.6
0.3
0
Dec-2018
Dec-2019
Dec-2020
Dec-2021
Dec-2022
RN040931
RN041242

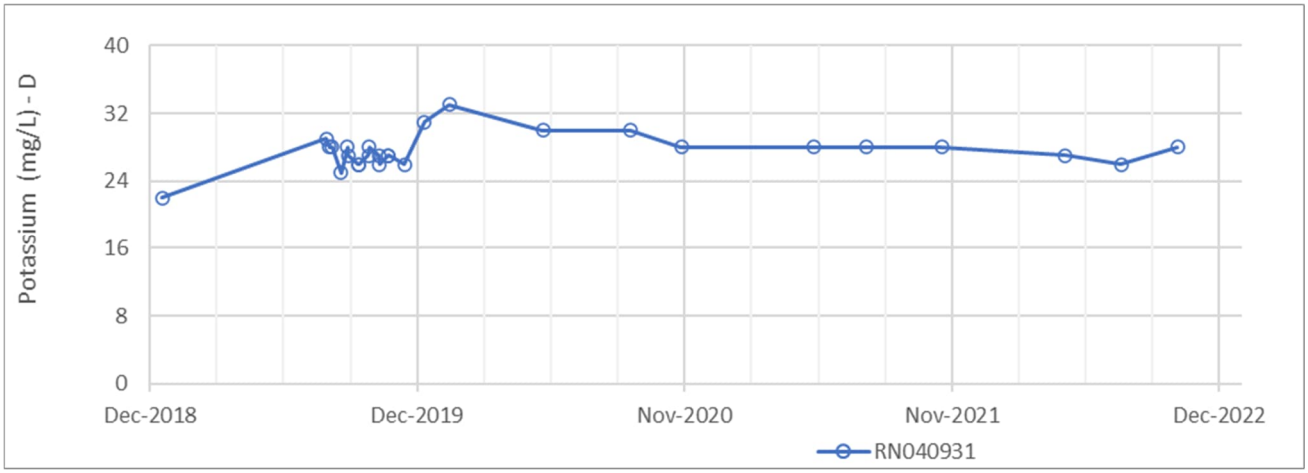

Inacumba South
Strontium (mg/L) - T
1.5
1.2
0.9
0.6
0.3
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040932

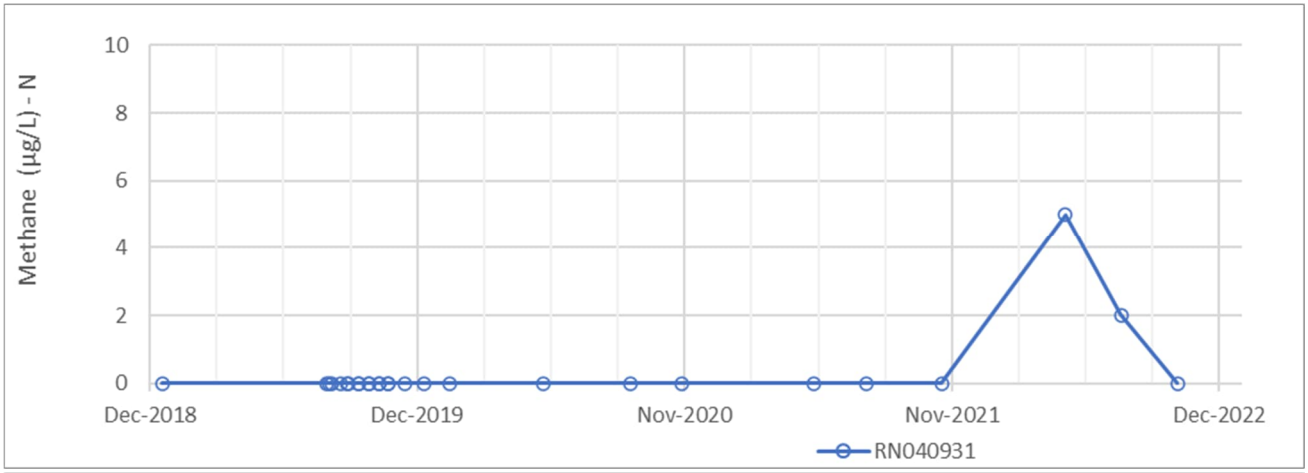
Attachment C – Inacumba Timeseries Charts

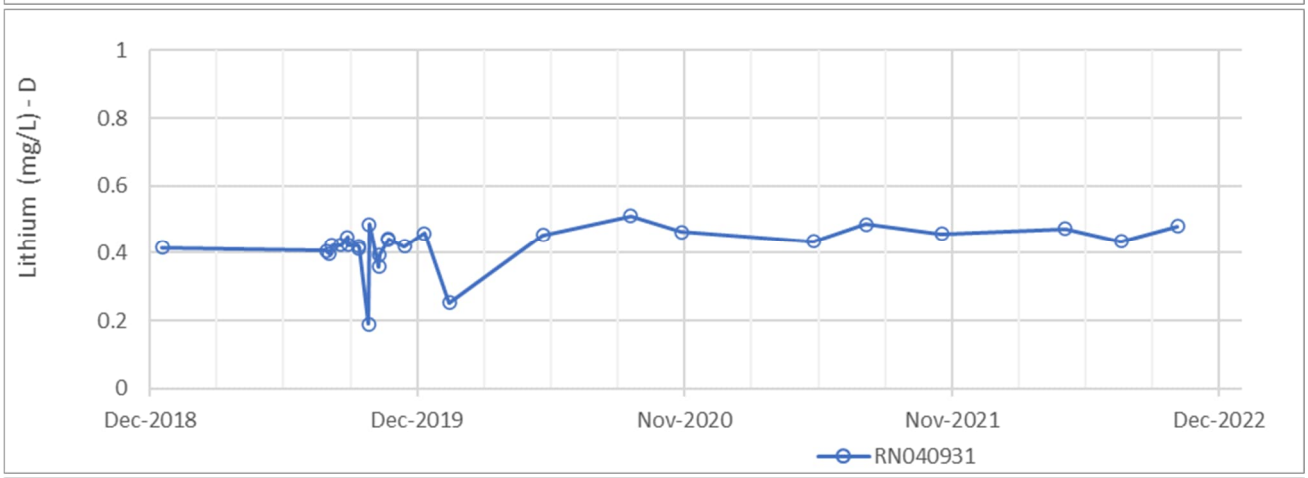

pH - Field (pH Unit) - N
9
8.5
8
7.5
7
6.5
6
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040931

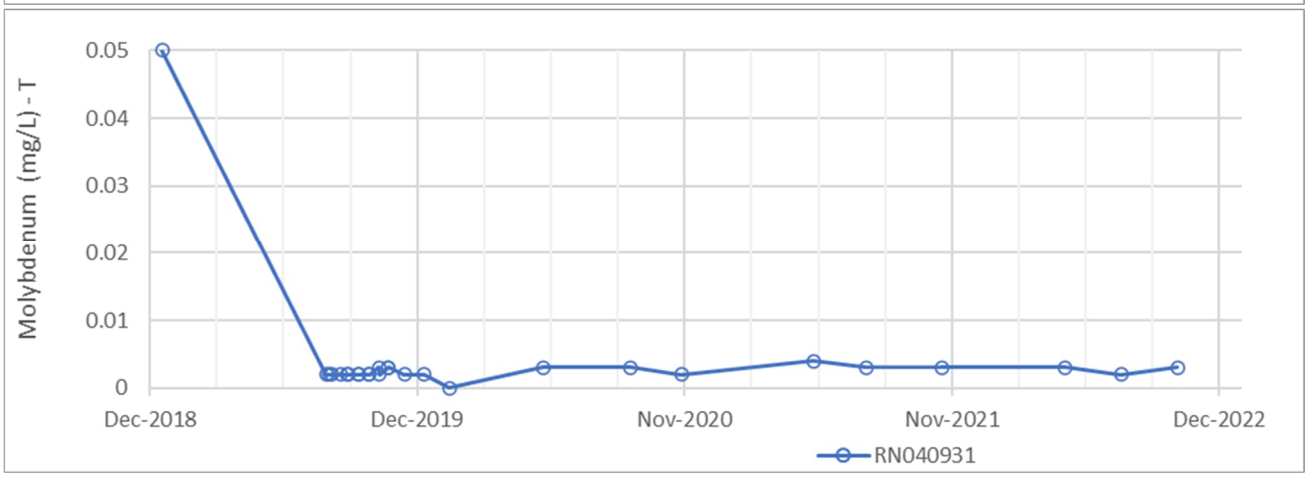

pH - Lab (pH Unit) - N
9
8.5
8
7.5
7
6.5
6
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040931

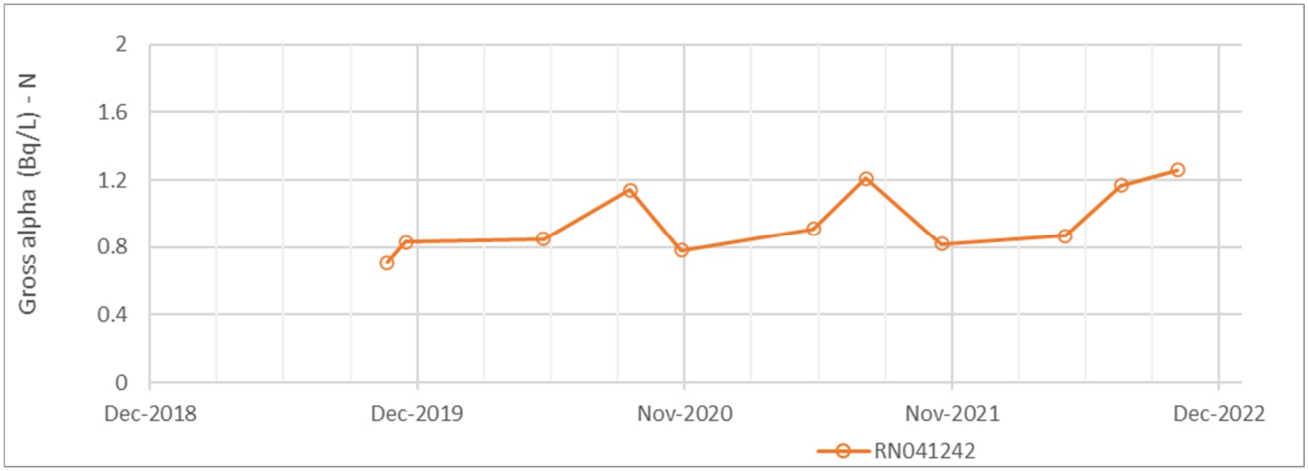

Carbonate Alkalinity as CaCO3 (mg/L) - N
30
24
18
12
6
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040931

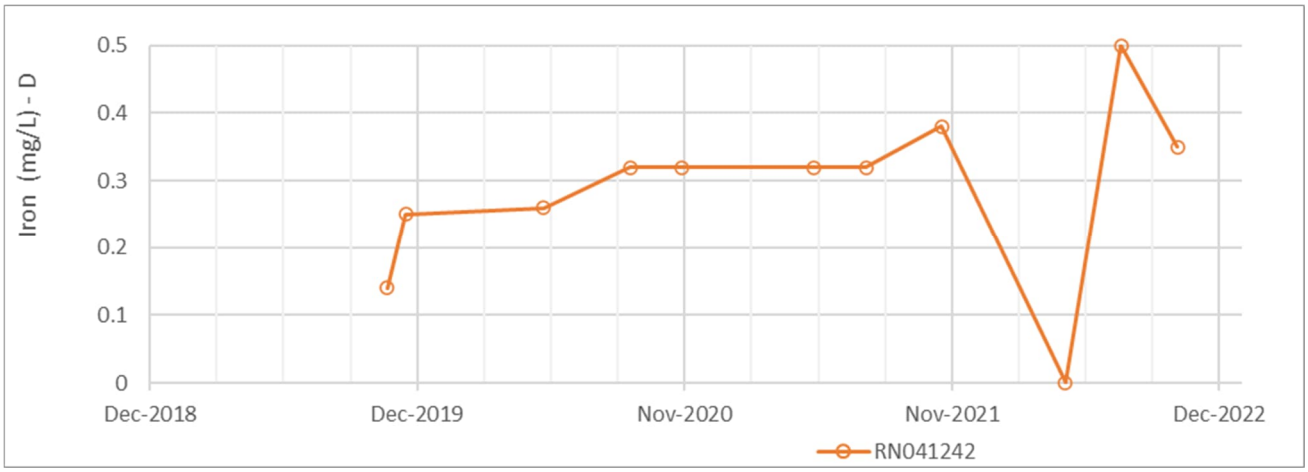

Potassium (mg/L) - D
40
32
24
16
8
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040931

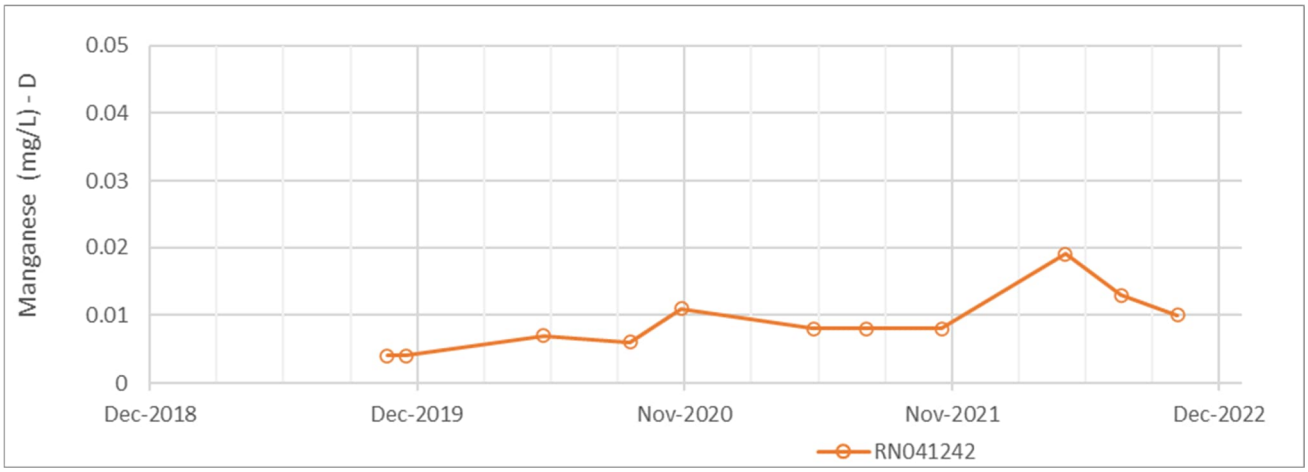

Methane (µg/L) - N
10
8
6
4
2
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040931

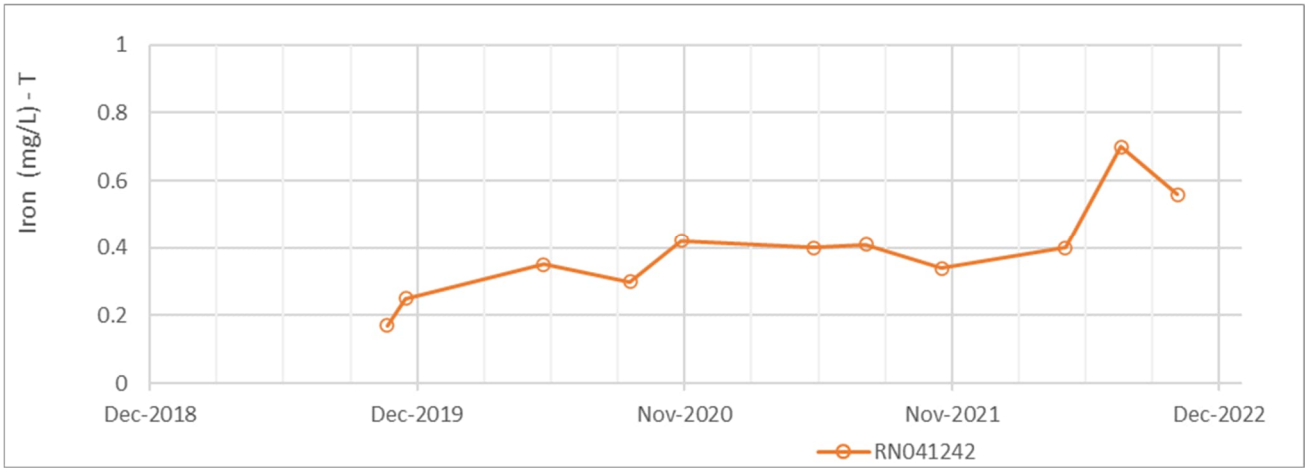

Lithium (mg/L) - D
1
0.8
0.6
0.4
0.2
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040931

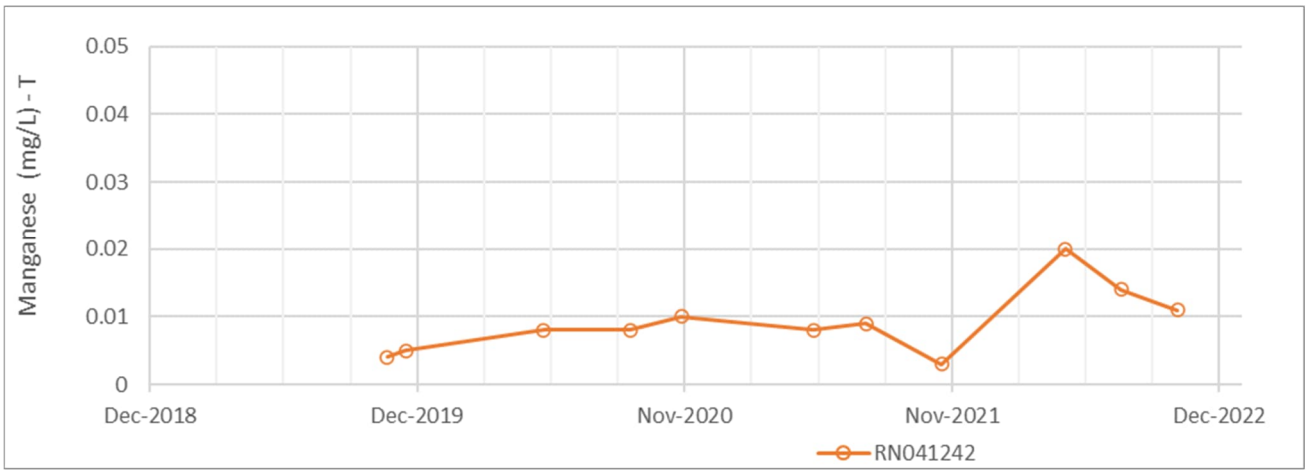

Molybdenum (mg/L) - T
0.05
0.04
0.03
0.02
0.01
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN040931


Gross alpha (Bq/L) - N
2
1.6
1.2
0.8
0.4
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN041242


Iron (mg/L) - D
0.5
0.4
0.3
0.2
0.1
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN041242


Manganese (mg/L) - D
0.05
0.04
0.03
0.02
0.01
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN041242


Iron (mg/L) - T
1
0.8
0.6
0.4
0.2
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN041242


Manganese (mg/L) - T
0.05
0.04
0.03
0.02
0.01
0
Dec-2018
Dec-2019
Nov-2020
Nov-2021
Dec-2022
RN041242