



Marine, Coastal and Surface Water Data Collection Report

K+S Salt Australia Pty Ltd

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1 INTRODUCTION

K+S Salt Australia (K+S) is proposing to construct a solar salt evaporation facility (the Ashburton Salt Project) approximately 40 km south west of Onslow. The facility will be constructed on existing salt flat areas that are located inshore from the coast.

The project will require a range of infrastructure to be constructed including a seawater intake and hypersaline wastewater (bitterns) outfall, as well as a jetty and berthing pocket to allow for export of the salt product.

K+S commissioned Water Technology to prepare suite of reports regarding coastal, intertidal and inland surface waters to support the preparation of an Environmental Review Document (ERD) for the project. The suite of reports prepared by Water Technology (2021) are listed below:

- Marine, Coastal and Surface Water Existing Environment.
- Surface Water Assessment and Modelling.
- Nutrient Pathways Assessment and Modelling.
- Marine and Coastal Assessment and Modelling.

This report (Marine, Coastal and Surface Water Data Collection) focuses on the fieldwork and resulting data collection undertaken by Water Technology and other scientists to inform the above reports.

2 OVERALL FIELDWORK SUMMARY 2017 – 2021

A wide range of fieldwork and monitoring has been undertaken for this project spanning over 5 years from 2017 through 2021. This fieldwork and monitoring was undertaken by a range of different partners and is summarised in the table below and described in further detail in subsequent sections.

Table 2-1 Summary of fieldwork and monitoring 2017 through 2020

Timeframe	Organisation	Type	Description
Sept - Nov 2017	Water Technology	Oceanographic and Marine/Creek Water Quality	Water level logger deployment, water quality profiling, conductivity/temperature logger deployment, sediment sampling, wave logger deployment and Acoustic Doppler Current Profiler (ADCP) transects.
April 2018	Water Technology	Oceanographic and Marine/Creek Water Quality	Logger deployment for temperature, salinity and water level.
Nov 2018 – Nov 2020	University of WA and Terrafirma Offshore	Oceanographic and Marine/Creek Water Quality (long term baseline)	Water quality (pH, salinity, turbidity, nutrients, metals, hydrocarbons) Deployment of loggers for water level. ADCP transects.



Timeframe	Organisation	Type	Description
April 2019	Biota	Surface Water Quality	Water sampling of salt flats, claypans and creek lines after a rainfall event (water quality and nutrients)
October 2019	Water Technology	Oceanographic	ADCP transects.
Feb, May, Aug, Oct 2019	AECOM	Oceanographic, Benthic Habitat and Creek Water Quality	Creek water level, creek water sampling (nutrients), sub-creek water sampling (nutrients), algal mat and salt flat sampling (moisture and photosynthetic activity)
December 2020 – April 2021	Terrafirma Offshore	Marine Water Quality	Water quality sampling Locker Point (copper at low levels).
March 2021	Terrafirma Offshore	Surface Water Quality	Water quality sampling of salt flats after a rainfall event (water quality and nutrients).

3 SEPTEMBER TO NOVEMBER 2017 – WATER TECHNOLOGY – COASTAL AND WATER QUALITY MONITORING

3.1 Summary

A coastal data collection program was carried out in the vicinity of the Ashburton Salt Project site between September 2017 and November 2017.

This program consisted of monitoring of key parameters such as water levels, water quality, conductivity, tidal currents, and creek discharge to allow for calibration and validation of models.

Figure 3-1 presents the data collection locations from the monitoring campaign. This included: water level logger deployment, water quality profiling, conductivity/temperature logger deployment, sediment sampling, wave logger deployment and ADCP transects.

It should be noted that the jetty/outfall location has changed since this deployment in 2017 and is now located a few hundred meters to the west (as shown on the figure below), although the 2017 sampling is still considered representative of conditions at the proposed jetty site.

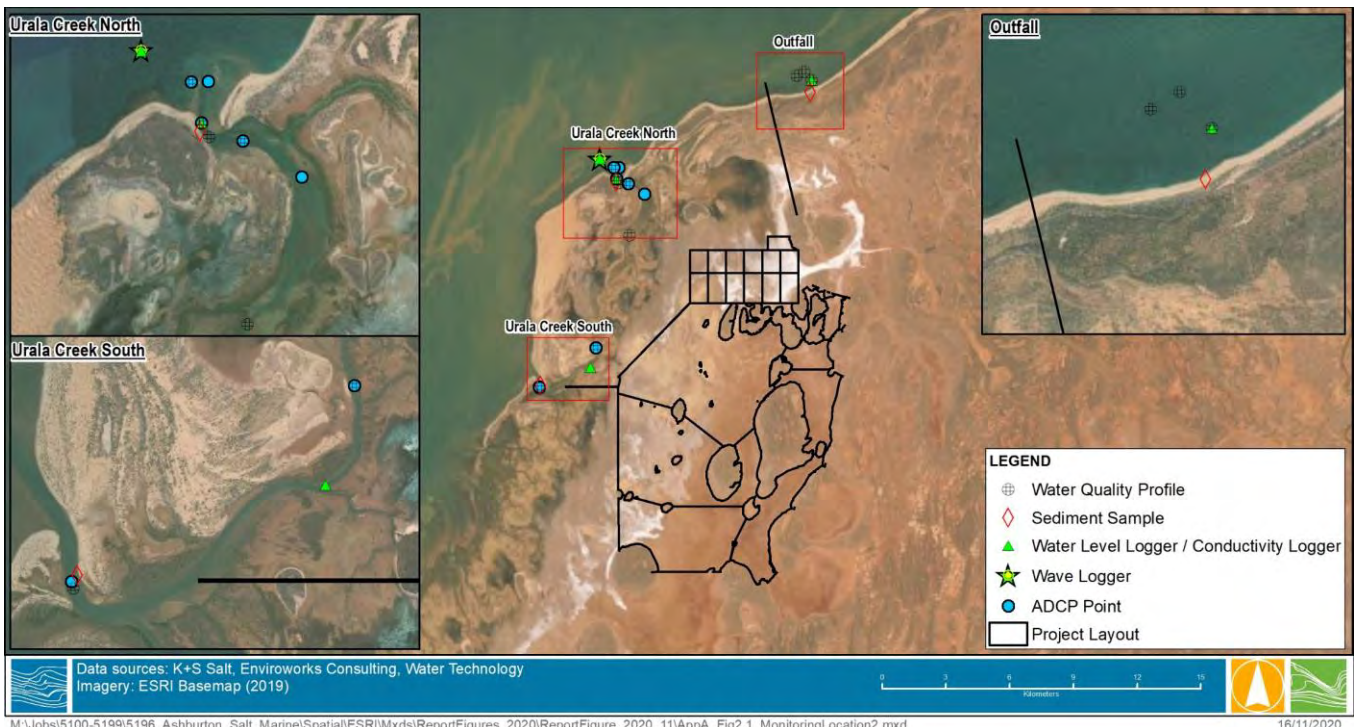


Figure 3-1 Overall monitoring program undertaken between September and November 2017



3.2 Water Quality Profiles

In-situ vertical water quality profiles were collected on the 12th and 13th of September 2017 using an appropriately calibrated multi-parameter sensor which measured a range of water quality parameters.

Vertical profiles were collected at the proposed outfall location (Locker Point), in Urala Creek North and Urala Creek South (refer to Table 3-1 and Figure 3-1 for locations).

Table 3-1 Location of water quality profile measurements

Site	Location	GPS Coordinates	Sample Date/Time	Tide
Outfall_WQ1	Proposed outfall location (Locker Point)	21°47.377'S 114°46.247'E	12/09/2017 11:30	Flood
Outfall_WQ2	Proposed outfall location (Locker Point)	21°47.157'S 114°46.040'E	12/09/2017 12:24	Flood
Outfall_WQ3	Proposed outfall location (Locker Point)	21°47.257'S 114°45.850'E	12/09/2017 12:41	Flood
UC_N_WQ1	Urala Creek North	21°51.253'S 114°41.208'E	12/09/2017 13:59	Flood
UC_N_WQ2	Urala Creek North	21°49.954'S 114°41.196E	12/09/2017 14:45	Ebb
UC_N_WQ3	Urala Creek North	21°49.923'S 114°40.941'E	12/09/2017 14:53	Ebb
UC_N_WQ4	Urala Creek North	21°49.531'S 114°40.811'E	12/09/2017 15:09	Ebb
UC_N_WQ5	Urala Creek North	21°49.821'S 114°40.884'E	13/09/2017 11:57	Flood
UC_S_WQ1	Urala Creek South	21°54.106'S 114°40.249'E	13/09/2017 13:40	Flood
UC_S_WQ2	Urala Creek South	21°55.116'S 114°38.696'E	13/09/2017 15:04	Approx. High tide

Figure 3-2 to Figure 3-4 present water column salinity measurements at the monitoring locations.

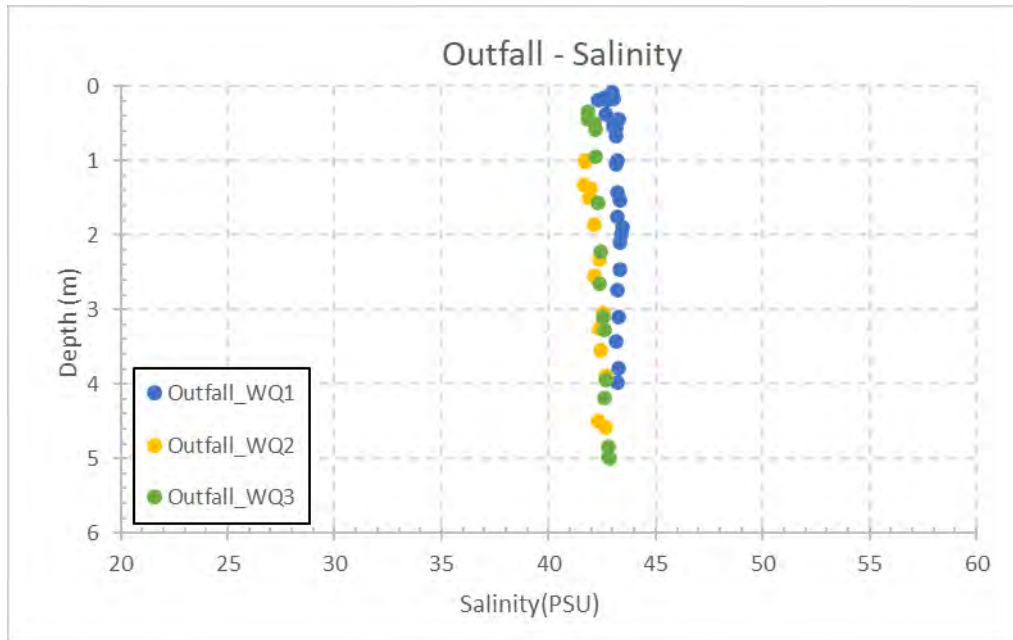


Figure 3-2 Salinity observed in the vicinity of the proposed outfall location (Locker Point)

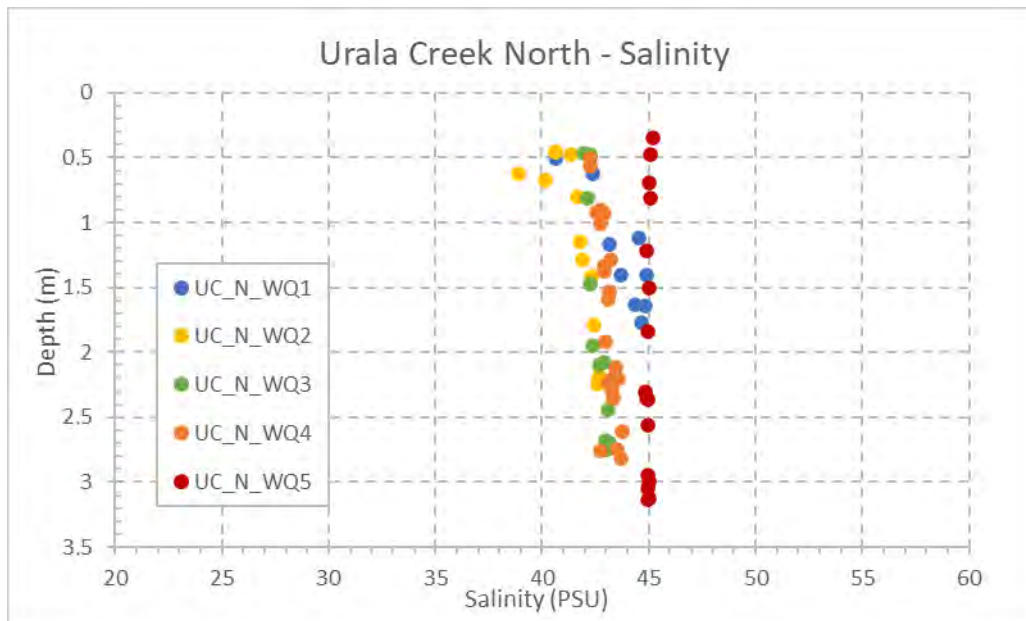


Figure 3-3 Salinity observed in Urala Creek North

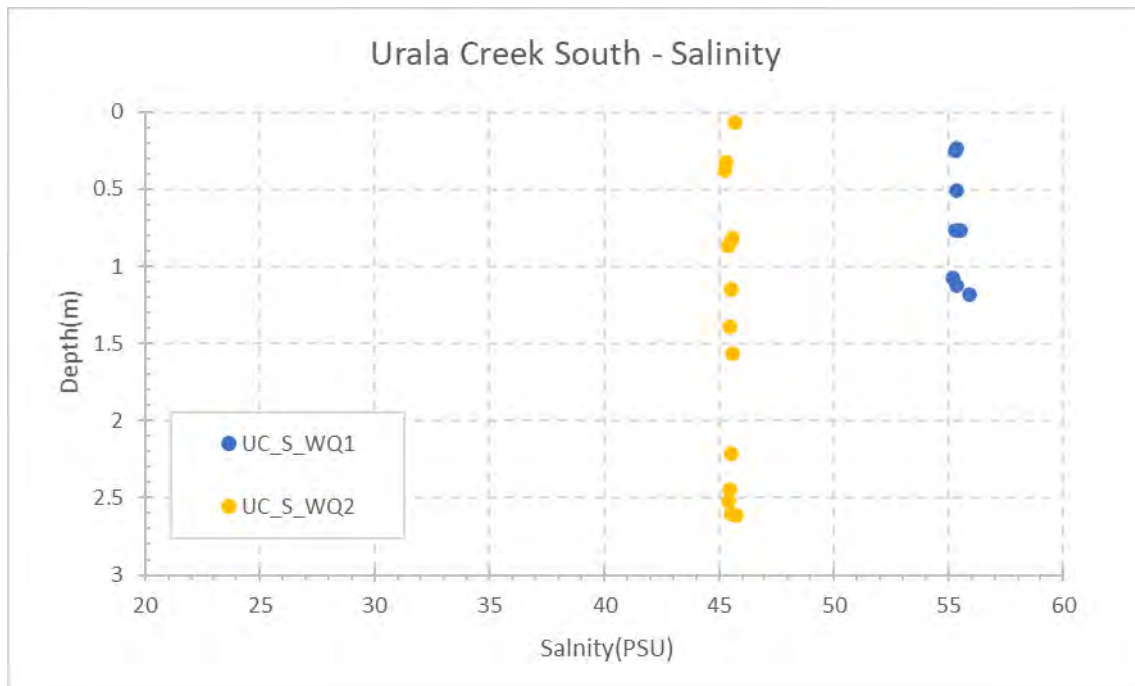


Figure 3-4 Salinity observed in Urala Creek South

Salinity values recorded at the nearshore site (near Locker Point) and Urala Creek South were consistently higher than those measured in other regional studies. Salinity values recorded in Urala Creek North are in line with the range of values observed in previous regional studies (*Marine, Coastal and Surface Water Existing Environment*, Water Technology, 2021).

Three water temperature profiles were taken at the proposed bitterns discharge location (Locker Point) (Figure 3-5). Measured results at Outfall_WQ2 and Outfall_WQ3 were similar across the depth profile, ranging from 23.3°C at the surface to 22.8°C at the seabed.

Five water temperature profiles were taken in the vicinity of Urala Creek North (Figure 3-6). UC_N_WQ5 is an apparent outlier with no temperature gradient observed across the depth profile.

Two water temperature profiles were taken in Urala Creek South, one at the mouth (UC_S_WQ2) and one further upstream (UC_S_WQ1) as presented in Figure 3-7. There was a difference of about 1°C between the two sites, with the upstream location recording lower temperatures.

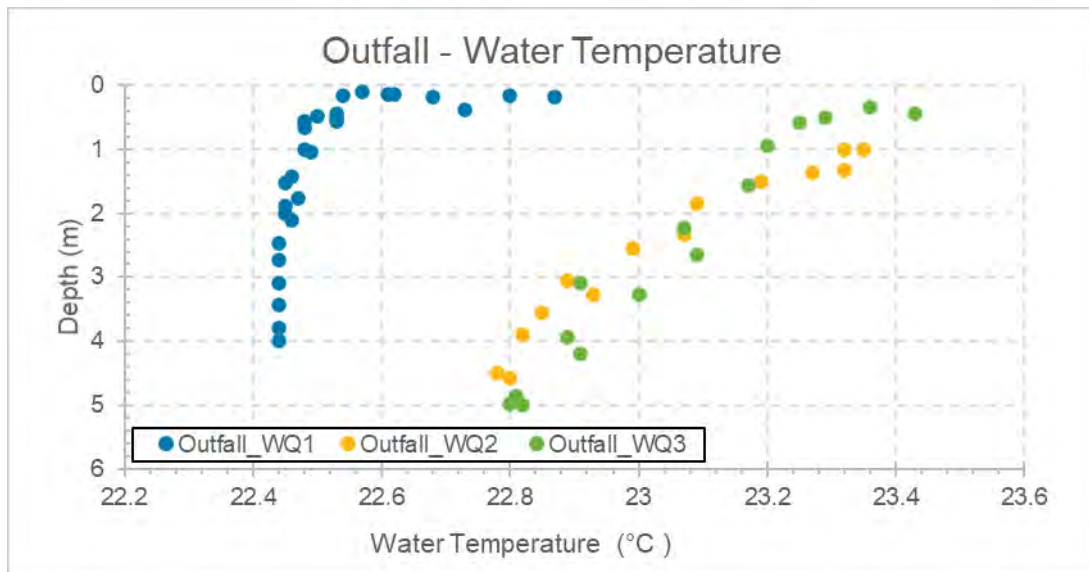


Figure 3-5 Water temperature profile in the vicinity of the proposed outfall (Locker Point)

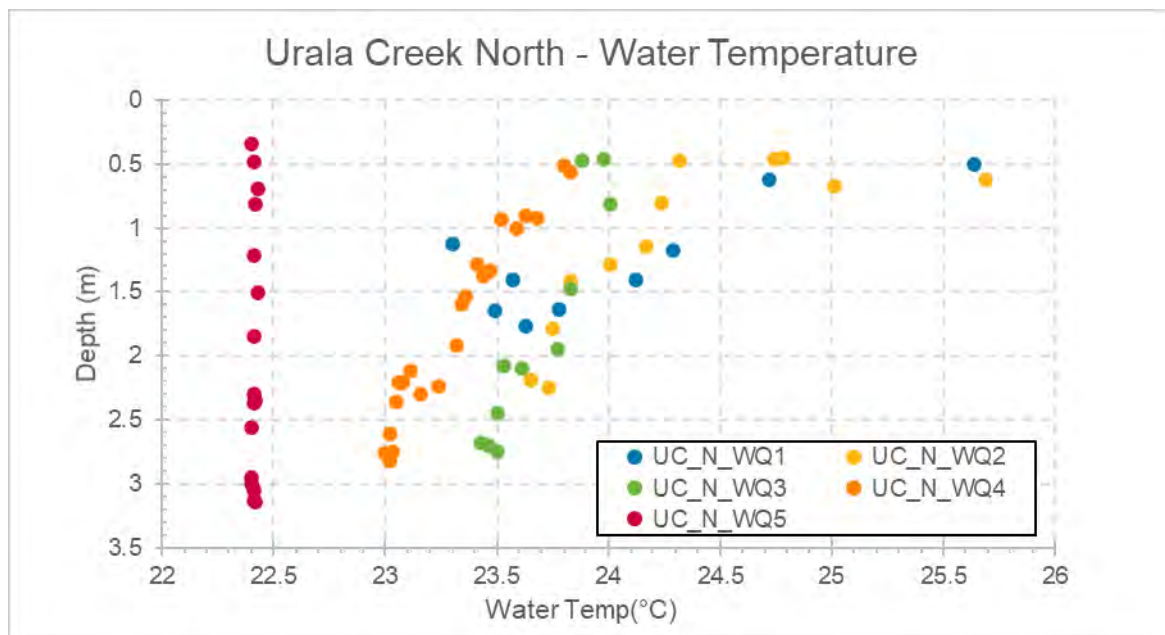


Figure 3-6 Water temperature profile in Urala Creek North

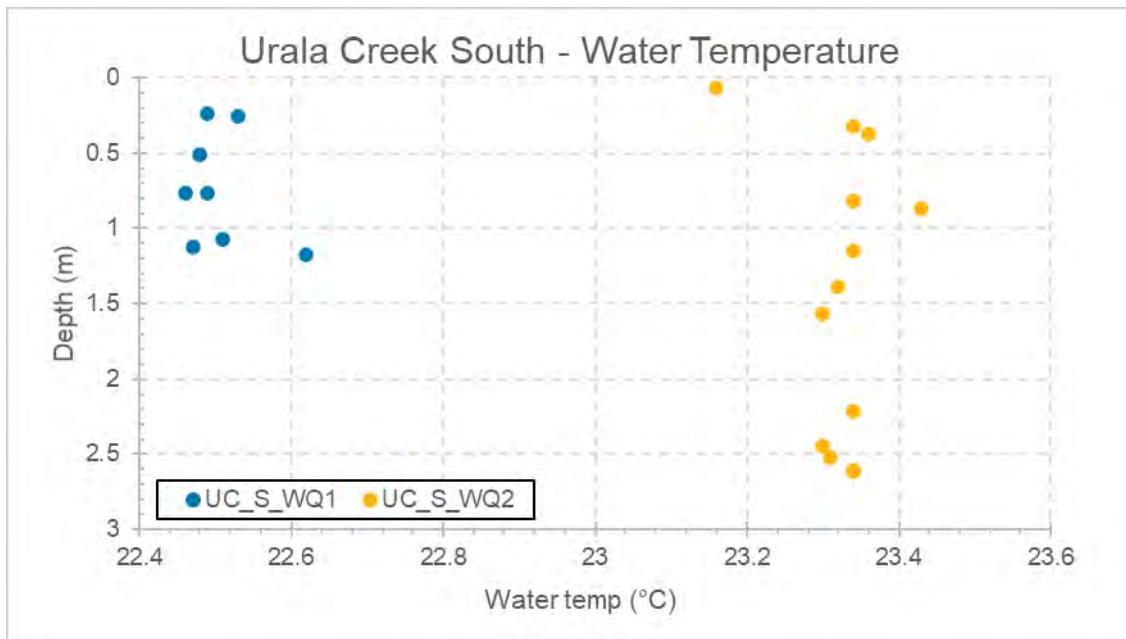


Figure 3-7 Water temperature profile in Urala Creek South

3.3 Water Level Data

A total of six (6) water level loggers were deployed across four (4) locations near the proposed development site to cover the regions of the outfall (Locker Point), Urala Creek North, Urala Creek South and an offshore location. The recording time interval was set to 30 minutes. The loggers were deployed on the 12th and 13th of September 2017 and retrieved on the 8th and 9th of November 2017. The loggers were located approximately 80cm above the seabed due to the configuration of the deployment frame. Table 3-2 provides logger deployment details.

Table 3-2 Water level logger deployment summary

Location	Water Level Logger	GPS Coordinates	Deployment Date/Time	Retrieval Date/Time	Depth at Deployment (m)
Outfall (Locker Point)	14839	21°47.377'S	12/09/2017	09/11/2017	4
	14325	114°46.247'E	11:20	14:20	
Offshore	14837	21°49.309'S 114°40.436'E	12/09/2017 15:50	08/11/2017 16:50	4.8
Urala Creek North	14268	21°49.821'S 114°40.884'E	13/09/2017 10:22	08/11/2017 16:30	2.6
Urala Creek South	14590	21°54.611'S 114°40.084'E	13/09/2017	08/11/2017	2.1
	14328		15:57	17:10	

Total pressure data recorded was converted to water elevation data with the assumption that 1mbar equals 0.012m. The average over the water elevation record was then subtracted at each sample point to obtain water levels in metres relating to Mean Sea Level (m MSL).

The observed water level variation for the offshore location, outfall (Locker Point), Urala Creek South and Urala Creek North are presented in Figure 3-8 to Figure 3-11.

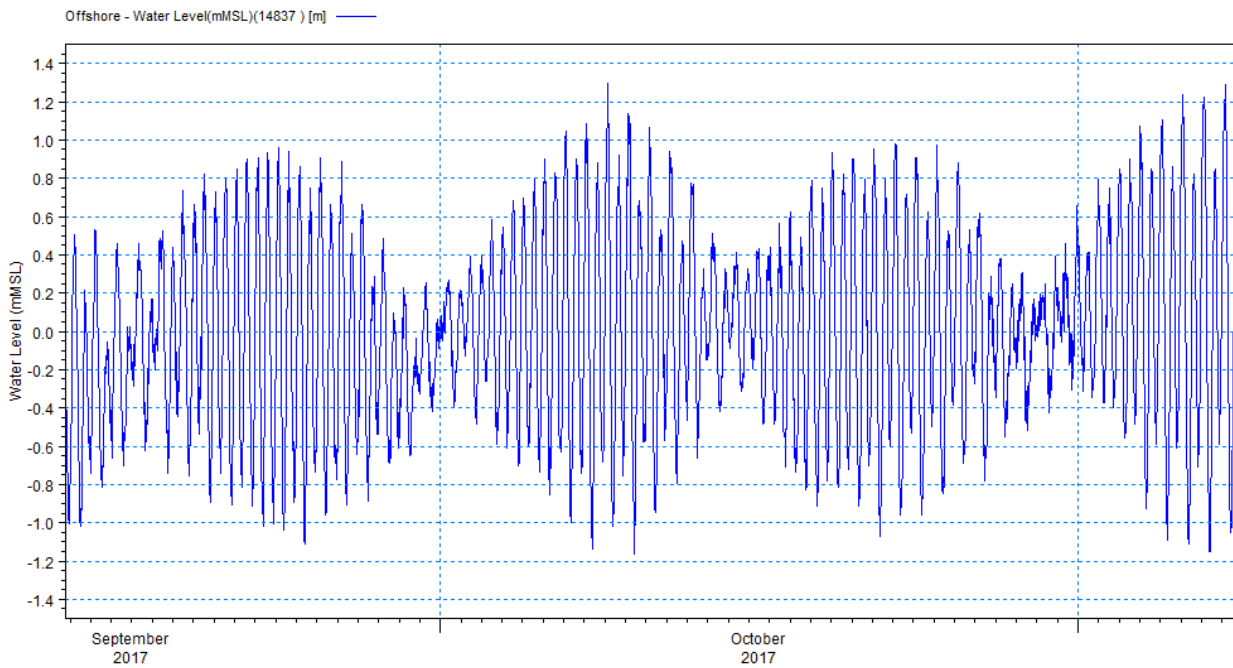


Figure 3-8 Water level variation observed at the offshore sampling location

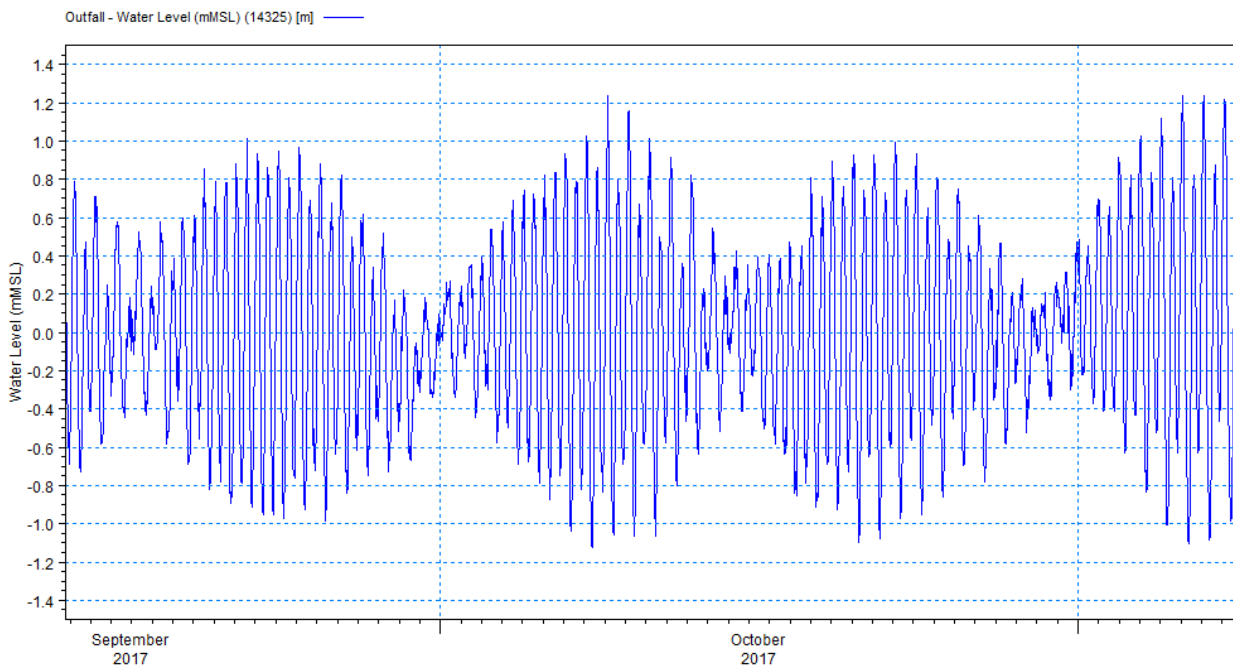


Figure 3-9 Water level variation observed at the outfall sampling location (Locker Point)

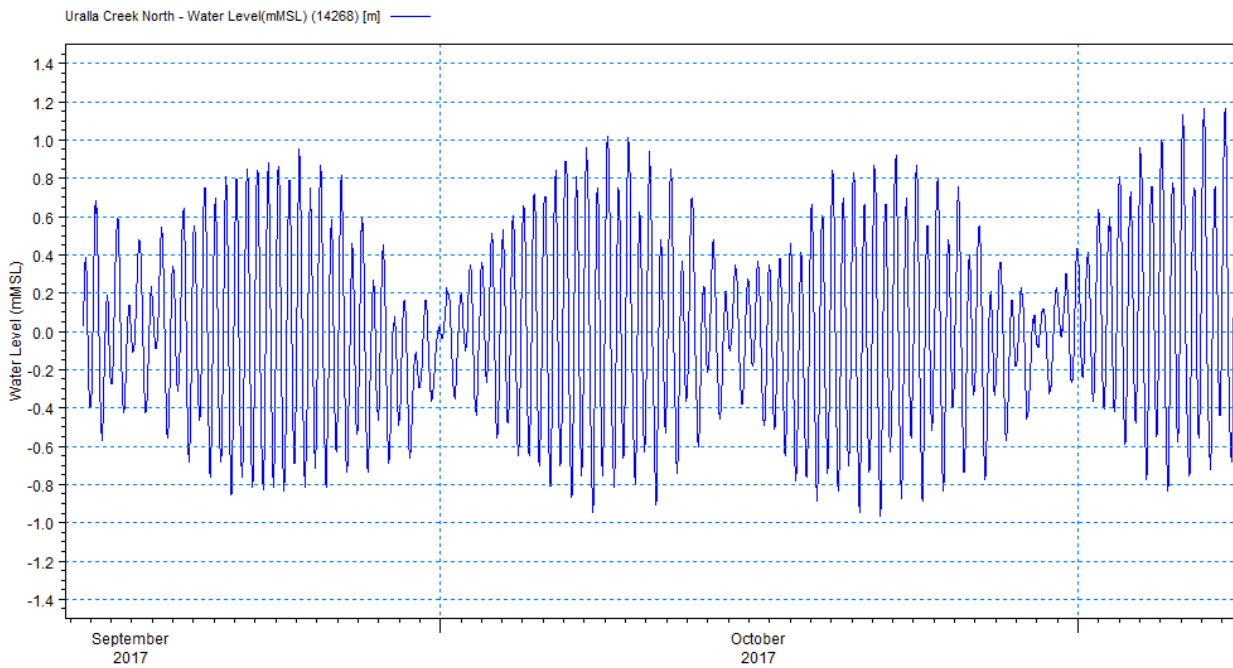


Figure 3-10 Water level variation observed at the Urala Creek North sampling location

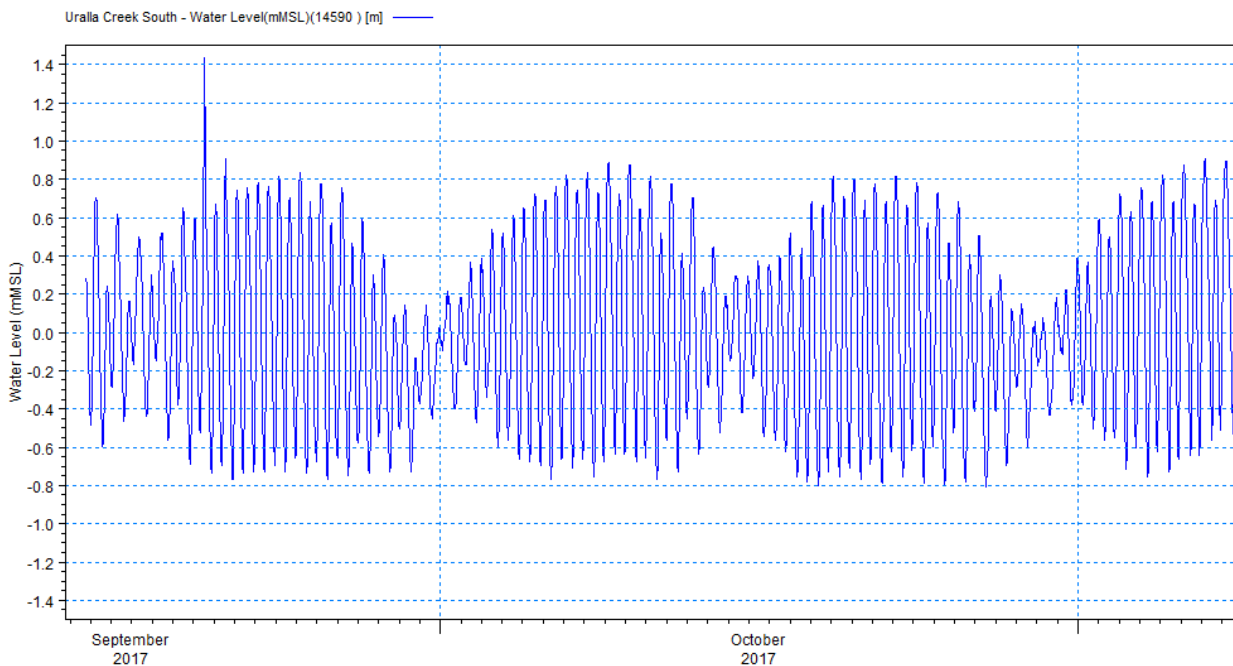


Figure 3-11 Water level variation observed at the Urala Creek South sampling location

3.4 Electrical Conductivity/Temperature Logger Data

Four (4) electrical conductivity loggers were deployed at the same locations as the water level loggers on the 12th and 13th of September and retrieved on the 8th and 9th of November 2017. The loggers were located approximately 80 cm above the seabed due to the configuration of the deployment frame. Water temperature at the sampling locations was recorded utilising both sensus and conductivity loggers set up at a 30-minute



and hourly sampling interval, respectively. Table 3-3 provides the deployment details. Data from the conductivity logger were converted to salinity using the electrical conductivity of the water and the water temperature.

Table 3-3 Conductivity/Temperature logger deployment summary

Location	Conductivity Logger	GPS Coordinates	Deployment Date/Time	Retrieval Date/Time	Depth at Deployment (m)
Outfall (Locker Point)	7400	21°47.377'S	12/09/2017	09/11/2017	4
	6283	114°46.247'E	11:20	14:20	
Offshore	6939	21°49.309'S	12/09/2017	08/11/2017	4.8
		114°40.436'E	15:50	16:50	
Urala Creek North	6277	21°49.821'S	13/09/2017	08/11/2017	2.6
	6276	114°40.884'E	10:22	16:30	
Urala Creek South	3138	21°54.611'S	13/09/2017	08/11/2017	2.1
		114°40.084'E	15:57	17:10	

Measured salinity data are presented in Figure 3-12. Generally, daily salinity variations are more evident in the shallow Urala Creeks, with salinity ranging from 38 to 55 PSU.

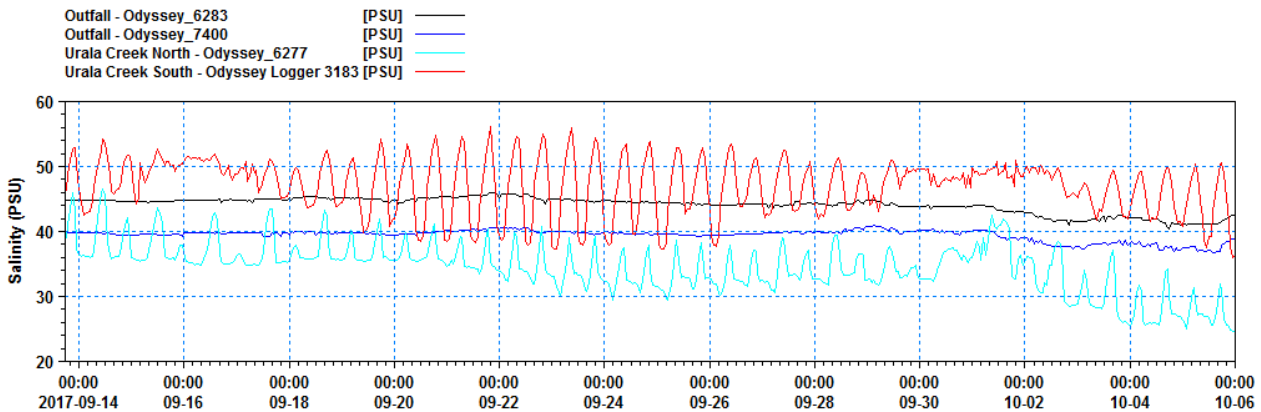


Figure 3-12 Timeseries of Measured Salinity (PSU)

Measured temperature data are presented in Figure 3-13.

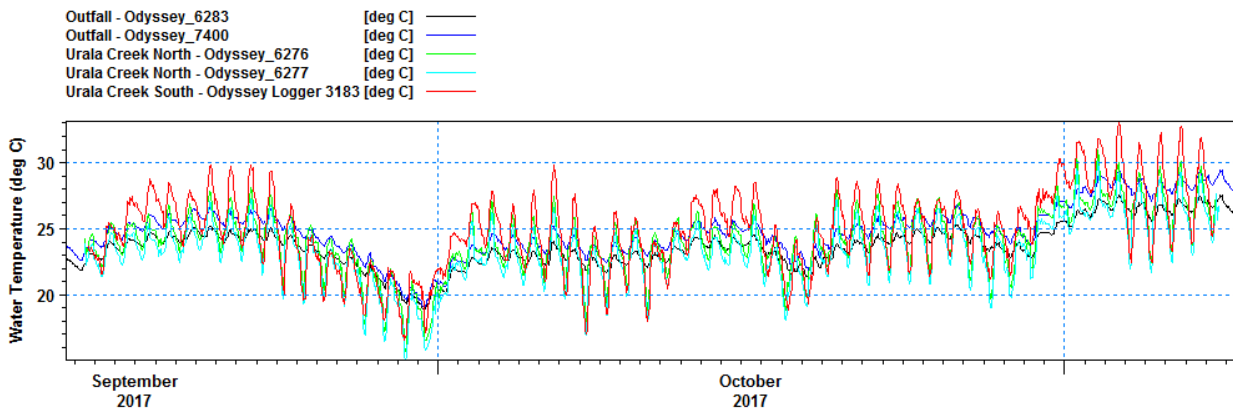


Figure 3-13 Timeseries of Measured Temperature

Generally, higher daily temperature variations occurred in the shallow Urala Creeks, with the temperature ranging from 17°C to 33°C. There is a strong correlation between temperatures recorded by the different loggers at the same sampling location, indicating the data is of a high quality. A consistent temperature pattern across the monitoring period also indicates good data quality.

Between February and June 2017, the warm Leeuwin Current flows southward along the outer North West shelf. During the winter months (June–August), southerly winds create localised upwellings of colder water nearshore and force the warmer waters away from the shallower coastal waters. During this period, waters in Exmouth Gulf are generally colder than the offshore waters.

3.5 Sediment Sampling

Sediment samples were taken at three locations (Table 3-4), all of which were collected around the water line and within the intertidal zone. Particle size analysis was undertaken by Hydrometer and AS1289 sieves, the results of the analysis are shown in Table 3-4. All sediment samples were classified to be fine sand.

Table 3-4 Locations of sediment Sampling

Location	GPS Coordinates	Sample Date/Time	Median particle size(mm)	Soil Classification
Outfall (Locker Point)	21°47.664'S 114°46.224'E	12/09/2017 12:45	0.213	Fine sand
Urala Creek South	21°55.049'S 114°38.719'E	13/09/2017 15:10	0.154	Fine sand
Urala Creek North	21°49.823'S 114°40.839'E	12/09/2017 15:15	0.158	Find sand



3.6 ADCP Transects

Acoustic Doppler Current Profiler (ADCP) transects and point current data were recorded across the proposed development site on the 12th and 13th of September 2017. It should be noted that strong south-easterly wind conditions experienced on the 12th made current measurements difficult and therefore further ADCP measurements were undertaken in 2019 to inform model development (see Section 8).

Table 3-5 and Table 3-6 present a summary of ADCP measurements on the 12th and 13th of September, respectively. A negative flow velocity indicates flood tide (i.e. upstream) flow in a creek.

Table 3-5 ADCP transect and point data collected in the vicinity of the proposed development site on the 12th of September 2017

Site	Transect/ Point Name	Number of ADCP Transects	Time of Sample	Average Velocity (m/s)	Average Discharge (m ³ /s)
Outfall_ADCP_1*	1a	2	12/09/17 12:03	0.013	n/a
Outfall_ADCP_2*	2a	1	12/09/17 12:45	0.016	n/a
UC_N_ADCP_1*	1a	2	12/09/17 14:10	-0.242	12.4
UC_N_ADCP_2*	2a	3	12/09/17 14:20	-0.197	16.9
UC_N_ADCP_3*	3a (Point)	n/a	12/09/17 14:35 (26sec)	-0.136	n/a
UC_N_ADCP_4*	4a (Point)	n/a	12/09/17 14:49 (78sec)	-0.044	n/a
UC_N_ADCP_5*	5a (Point)	n/a	12/09/17 14:56 (76sec)	-0.006	n/a
UC_N_ADCP_6*	6a	1	12/09/17 15:20	0.038	32.2

Table 3-6 ADCP transect and point data collected in the vicinity of proposed development site on the 13th of September 2017

Site	Transect/ Point Name	Number of ADCP Transect	Time of Sample	Average Velocity (m/s)	Average Discharge (m ³ /s)
UC_N_ADCP_7	7b	1	13/09/2017 10:34	0.221	20.5
UC_N_ADCP_7	8b	n/a	13/09/2017 10:56 (553sec)	0.234	n/a
UC_N_ADCP_7	9b	1	13/09/2017 11:10	0.327	30.5
UC_N_ADCP_7	10b	n/a	13/09/2017 11:24 (521sec)	0.371	n/a
UC_N_ADCP_7	11b	1	13/09/2017 11:36	0.364	40.0
UC_N_ADCP_7	12b	n/a	13/09/2017 11:45 (419sec)	0.463	n/a
UC_S_ADCP_1	1b	6	13/09/2017 12:42	0.370	56.7
UC_S_ADCP_2	2b	4	13/09/2017 13:30	0.307	13.1
UC_S_ADCP_2	3b (Point)	n/a	13/09/2017 13:38 (391sec)	0.285	n/a
UC_S_ADCP_2	4b	4	13/09/2017 13:50	0.283	14.3
UC_S_ADCP_2	5b (Point)	n/a	13/09/2017 14:03 (276sec)	0.186	n/a
UC_S_ADCP_2	6b	4	13/09/2017 14:14	0.171	9.1
UC_S_ADCP_2	7b	3	13/09/2017 14:40	0.133	7.6



Access to Urala Creek North was difficult due to the system being a highly dynamic creek, whereby its entrance configuration is modified regularly by weather events and lacking a clearly defined channel. In general, it is shallow in nature with large intertidal areas that make safe navigation challenging.

Wind conditions on the 13th of September 2017 were much more favourable, and this was reflected in the accuracy of the current and discharge measurement. Measurements on the 12th were of poorer quality, and have not been relied on during our studies.

3.7 Wave Logger

A single RBRsolo wave logger was set up at an offshore location on the 12th of September 2017 and retrieved on the 8th of November 2017 (refer to Figure 3-1 for location) to measure waves at hourly intervals. The logger had a sampling frequency of 2Hz and recorded data for a 34-minute period. Table 3-7 provides a summary of this initial two months deployment.

Table 3-7 Wave logger deployment summary

Location	Wave Logger	GPS Coordinates	Deployment Date/Time	Retrieval Date/Time
Offshore	41436	21°49.309'S; 114°40.436'E	12/09/2017 15:50	08/11/2017 14:20

Data quality was found to be relatively poor according to quality control assessments and has not been relied on during our studies.



4 APRIL 2018 – WATER TECHNOLOGY – COASTAL MONITORING

4.1 Summary

A further data collection event was undertaken in April 2018. This consisted of the deployment of loggers to measure salinity, water level and water temperature data. Figure 4-1 presents the locations where equipment was deployed.

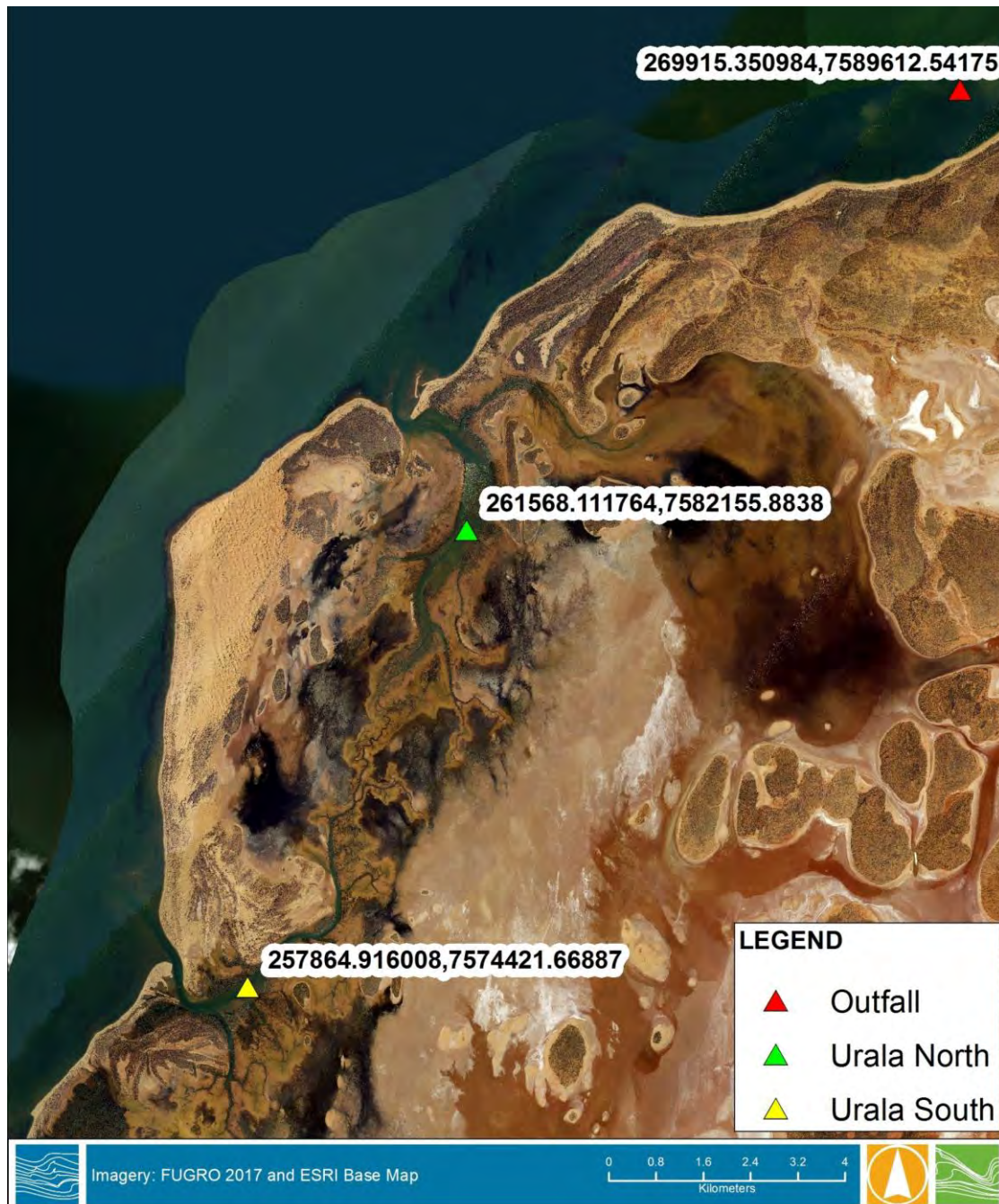


Figure 4-1 Logger locations



Table 4-1 provides a summary of this second deployment.

Table 4-1 Water Temperature Logger Information

Logger Id	Location	Measured Data	Data Quality Comments
U14590	Offshore	Temperature	Questionable
U14837	Urala Creek South	Temperature	Questionable
U14268	Urala Creek North	Temperature	Questionable
6283	Offshore	Salinity	Poor
7400	Urala Creek North	Salinity	Failed
3138	Urala Creek South	Salinity	Failed
U14590	Offshore	Water Level	OK, potential small drift
U14837	Urala Creek South	Water Level	Good
U14268	Urala Creek North	Water Level	Good

The temperature and salinity loggers performed poorly during this deployment. Failure of remote monitoring equipment can occur for a range of reasons, such as logger sedimentation, fouling, etc, which are often out of control of the deployment team. Such failure can often assist improving data collection techniques and recovery of more complete data samples in future deployments. Poor, failed or questionable salinity and temperature data collected during this deployment has not been relied on during our studies.

The water level data collection was successful and was added to the hydrodynamic study dataset.



5 NOVEMBER 2018 TO NOVEMBER 2020 – UWA - COASTAL AND WATER QUALITY MONITORING

5.1 Summary

The University of Western Australia (UWA) and local marine contractors (TerraFirma Offshore) undertook monthly monitoring of key water quality parameters in the vicinity of the project from November 2018 to November 2020. The scope of the long-term monitoring program was based on knowledge obtained during the first two data collection campaigns and included additional logger data to characterise the existing environment and to assist model calibration. The program was intended to:

- Characterise baseline water quality conditions at 10 pre-defined locations;
- Quantify water quality variability between locations, depths and at different tidal phases; and
- Collect additional data on wave, current, temperature and salinity for model validation.

As part of the two-year monitoring campaign by UWA, the following data was collected:

- Sonde water analysis probe in-situ multi-parameter profiles (monthly);
- In-situ logger measurements (continuous); and
- Water samples for laboratory analysis (monthly).

Data collection locations are displayed in Figure 5-1. In the figure, monthly monitoring sites are displayed as yellow dots, and in-situ logger locations are displayed as red squares.

The monthly water quality reports produced by UWA are provided in Appendix A.



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Figure 5-1 UWA monitoring sites



5.1.1 In-situ Sonde Profiling

In-situ measurements of water quality were performed with a multiple parameter water quality sonde deployed from a boat encompassing full vertical profiling from December 2018 onward. It should be noted that the dissolved oxygen (DO) was not measured vertically, with DO data provided for the surface and near the seabed. Figure 5-1 shows profile measurement locations.

A summary of available sonde profile data is presented in Table 5-1.

Table 5-1 Summary of Sonde Measurements

Eva Island	Sonde measurement of: <ul style="list-style-type: none"> ■ Chlorophyll/blue green algae) ■ Conductivity/salinity ■ Depth/Pressure ■ Total Dissolved solids (TDS) ■ Total Suspended Solids (TSS) ■ Turbidity ■ Temperature ■ Dissolved Oxygen (DO) ■ pH ■ Fluorescent dissolved organic matter (fDOM) 	<ul style="list-style-type: none"> ■ November 2018: Surface and bottom measurement only ■ December 2018 - February 2020: Monthly vertical sonde profiles ■ March 2020 -June 2020: No data ■ July 2020: only Urala Ck S channel and Locker Point profiled ■ August – September 2020 only Locker Point profiled 	Abrupt salinity variation in Jun 2019 and Nov 2019 Dissolved Oxygen stopped being measured from October 2019 onwards
Fly Island			
Locker Island			
Locker Point			
Rocky Point			
Urala Ck N channel			
Urala Ck N nearshore			
Urala ck S channel			
Urala Ck S nearshore			
Urala Ck S offshore			

5.1.2 Water Samples for Laboratory Analysis

In addition to vertical profiles, water samples were collected at the water surface and near the seabed. A summary of water sampling locations for laboratory analysis is presented in Table 5-2.

Figure 5-1 (see Section 5.1) shows monthly measurement locations, which are the same the sonde profiles sites.

A total of 300 samples were collected each month and stored in 6 x 35 L insulated containers. Water samples collected in the field required transport to the laboratory for analysis, which was conducted in accordance with the standards outlined by ANZECC and the Government of Western Australia Department of Water’s field sampling guidelines. Items were filtered, refrigerated or frozen as required and reached the laboratory within 24-54 hours of collection at sea.

Table 5-2 Summary of water sampling for laboratory analysis

Eva Island	Water samples for laboratory analysis: <ul style="list-style-type: none"> ■ Speciated nitrogen 	<ul style="list-style-type: none"> ■ November 2018 – February 2020: Monthly 	Sites may vary monthly
Fly Island			
Locker Island			



Locker Point	<ul style="list-style-type: none"> Speciated phosphorus 	<ul style="list-style-type: none"> water samples collected and analysed March and April 2020: No data May 2020 – November 2020: only salinity and conductivity were analysed at one site - Locker Point 	
Rocky Point	<ul style="list-style-type: none"> Speciated carbon 		
Urala Ck N channel	<ul style="list-style-type: none"> Metals, metalloid toxicants and selenium 		
Urala Ck N nearshore	<ul style="list-style-type: none"> Chlorophyll 		
Urala ck S channel	<ul style="list-style-type: none"> Salinity/conductivity 		
Urala Ck S nearshore	<ul style="list-style-type: none"> Hydrocarbons 		
Urala Ck S offshore	<ul style="list-style-type: none"> Biochemical oxygen demand 		

A more detailed description on the measured parameters and monthly reporting can be found in Appendix A, which contains the monthly reports produced by UWA.

5.1.3 Continuous In-situ Loggers

Continuous in-situ loggers were deployed at both the Urala Creek South intake and Locker Point outfall sites to measure temperature, salinity, turbidity and water level data as summarised in Table 5-3.

Table 5-3 Continuous Loggers Deployed

Urala Creek South (UCS) Intake	-21.9177801 114.655970	Water level, temperature, salinity, turbidity	RBRsolo ³ D Depth Logger Hobo conductivity logger (before Jun 2019) CTD (from Jun 2019 onwards) Turbidity logger (Feb & Oct 2019) NTU turbidity sensor (from Nov 2019 onwards)	Hobo logger data was not reliable Red mud fouling on sensor which may affect the data quality of salinity measurements
Locker Point	-21.7910537 114.7473817	Water level, temperature, salinity, turbidity	RBRsolo ³ D Depth Logger Hobo conductivity logger (before Jun 2019) CTD (from Jun 2019 onwards) Turbidity logger (Mar 2019, from Jun 2019 to Oct 2019) NTU turbidity sensor (from Nov 2019 onwards)	CTD Salinity measurements had varying success

The use of continuous loggers in marine environments can be problematic due to biological and sediment fouling of the sensors. This occurred during the program and a number of troubleshooting exercises were carried out including changing equipment type, trialling different sensor positions, using a copper sheath to prevent biological fouling and in times of high natural turbidity, retrieving and cleaning the loggers fortnightly instead of monthly.

This resulted in some of the continuous data being unreliable (particularly salinity), however the above sonde profiling and water sampling for laboratory analysis still provided an ongoing accurate record for the monitoring period.



5.2 Water Levels (Continuous)

Water level data recorded by continuous loggers at Locker Point and Urala Creek South are presented in Figure 5-2. Measured water level data provides a long-term record for hydrodynamic model calibration and validation, however there are some gaps at both locations which occurred when data could not be successfully retrieved after the monthly deployment.

At Locker Point, from May 2020 onwards, the amplitude of the data appears to be incorrect, likely due to a change in logging units. The correct measurement units are unknown, however multiplying the data by a factor of 3 to 4 results in the expected amplitude, which could indicate the units are in feet instead of metres. As this is an inference, we did not correct the data and have presented it as provided.

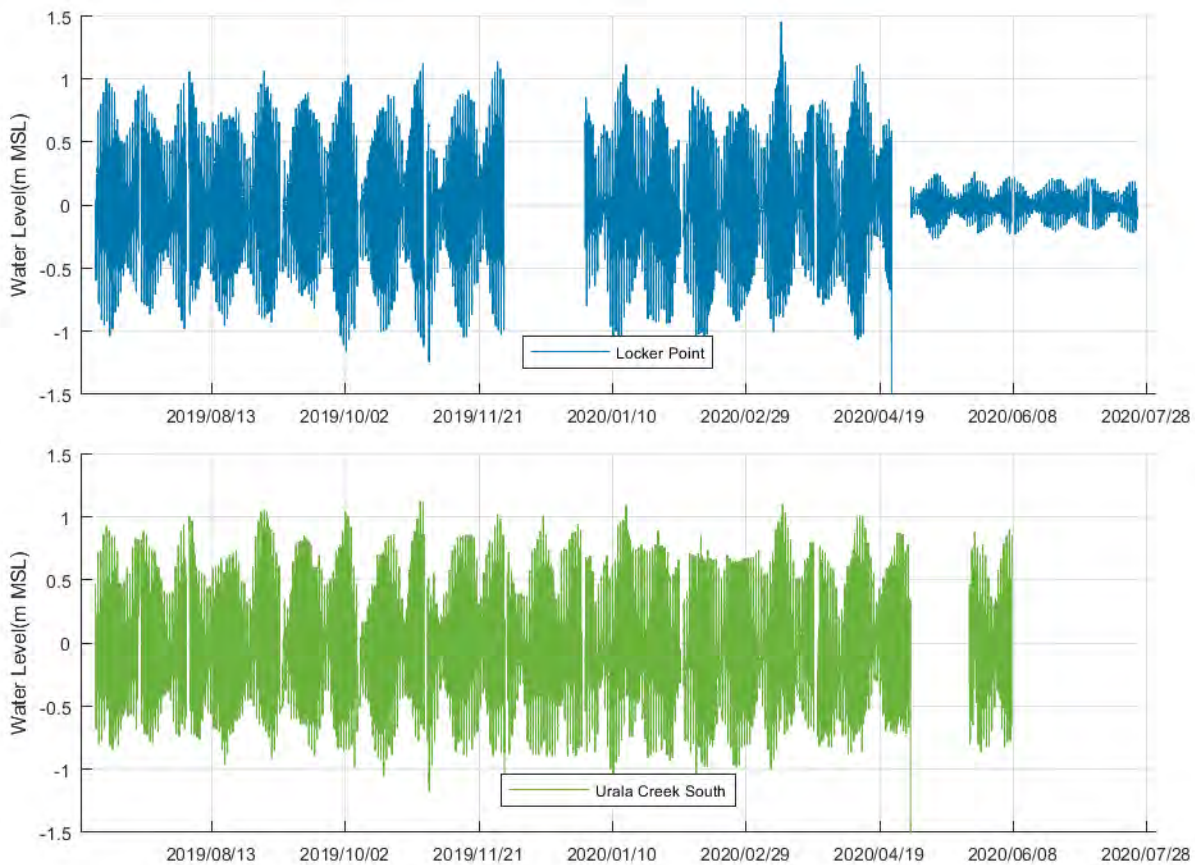


Figure 5-2 Water Level Records



5.3 Water Temperature

5.3.1 In-situ Continuous Measurements

Continuous temperature data recorded by loggers at Locker Point and Urala Creek South are presented in Figure 5-3. There is a large seasonal temperature variation at both sites, and large daily flux at Urala Creek South. Measurements from the Urala Creek South logger show a semi-diurnal variation of 3 to 5°C throughout all seasons, which is an order of magnitude higher than the diurnal variation at Locker Point.

These variations can be attributed to the shallow depth of water within the creek, as shallow water heats rapidly during low tide and is mixed with cooler water as the tide floods. Temperatures within the creek also show a more dramatic response to climate conditions, with a 5-10°C drop in temperature during storm events. The temperature response to storms was not as pronounced at the jetty location (Locker Point) where the larger body of water is less responsive to rapid heating and cooling.

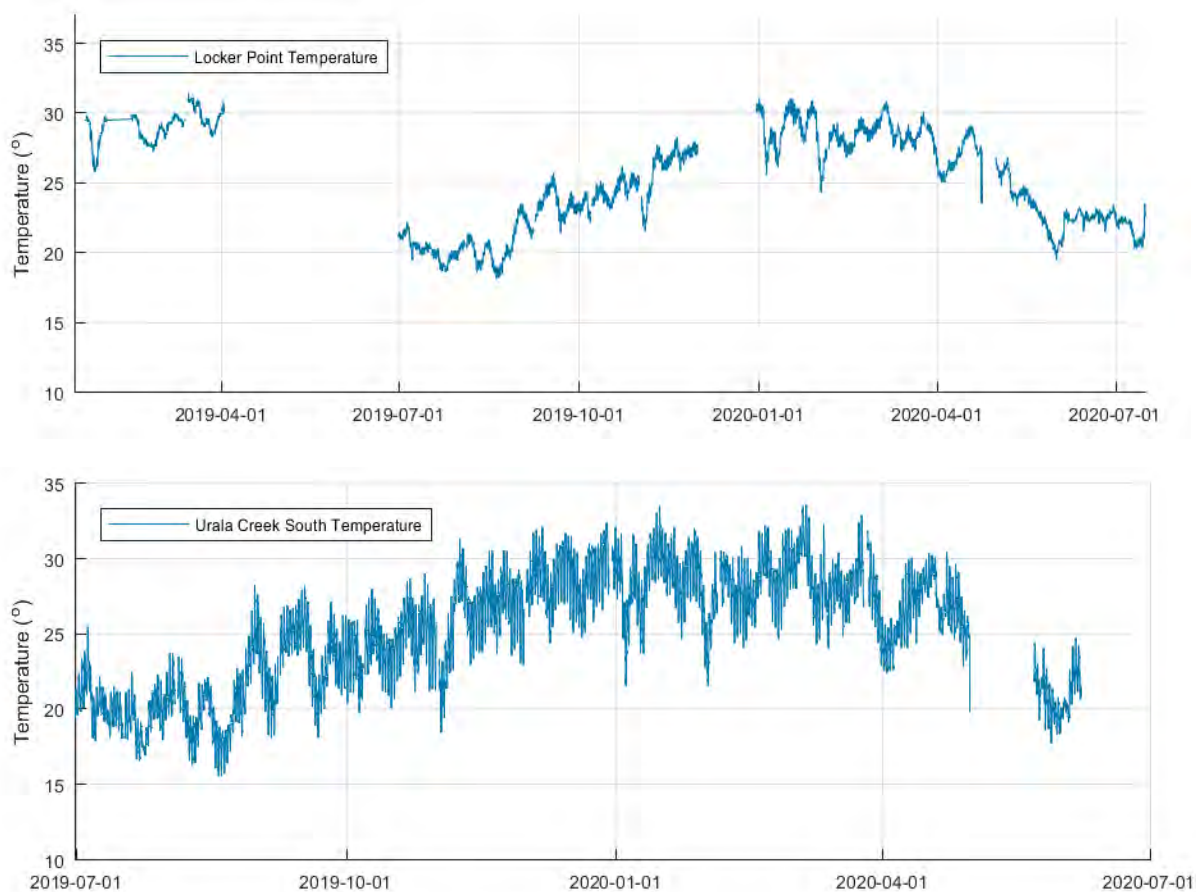


Figure 5-3 Water temperature measurements at Locker Point (top) and Urala Creek South (bottom)



5.3.2 Monthly Sonde In-situ Profiles

A timeseries of water temperature at 2 m below the surface was extracted from the sonde profiles and is presented for Urala Creek South and Locker Point in Figure 5-3. The data shows the strong seasonal variation in temperature, the coldest months being June/July and the warmest being December.

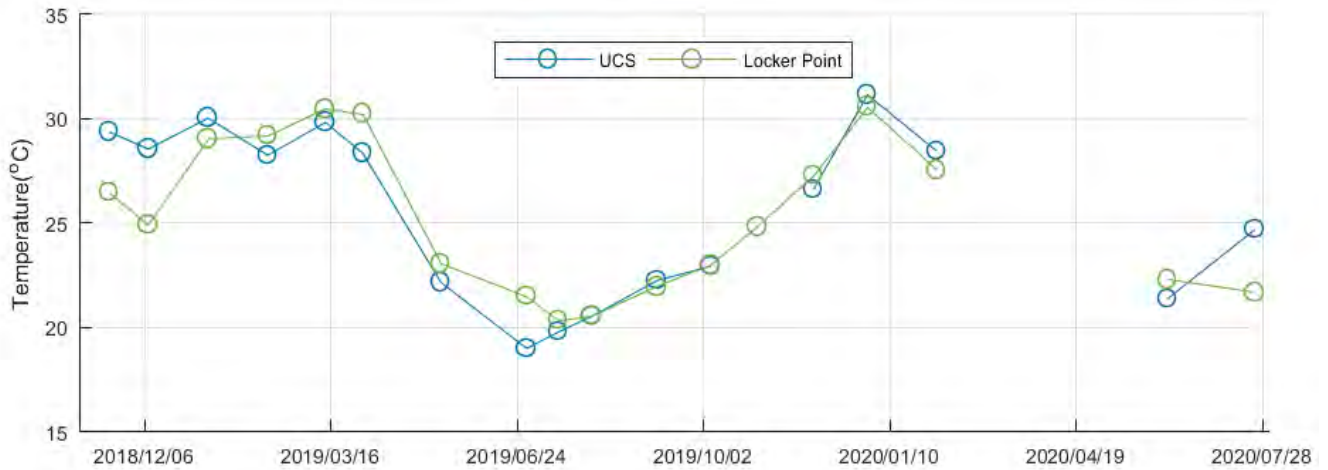


Figure 5-4 Timeseries of water Temperature 2m below the surface at Urala Creek South and Locker point

Based on the temperature variation above, three spatial temperature plots representing the coldest (July 2019), intermediate (October 2019) and warmest (January 2020) months are illustrated in Figure 5-5 to Figure 5-7, respectively. The plotted data were extracted from approximately 2 m below surface or from mid depth if the water depth was too shallow.



Figure 5-5 Spatial map of temperature 2 m below the surface in July 2019



Figure 5-6 Spatial map of temperature profiles 2 m below the surface in October 2019



Figure 5-7 Spatial map of temperature profiles 2 m below the surface in January 2020



5.4 Salinity

5.4.1 In-situ Continuous Measurements

Quality control shows salinity data from the continuous loggers is unreliable due to sonde in-situ results and NATA accredited laboratory results not matching continuous logger data for the same sampling times and locations. There is also a clear drift in the continuous logger data likely due to sensor fouling.

However, monthly in-situ sonde probe data and NATA accredited laboratory analysis data was still available to provide an ongoing monthly record of salinity as described below.

5.4.2 Monthly Sonde In-situ Profiles and Water Sampling Laboratory Data

Monthly vertical profiles of salinity are presented in Figure 5-8. The plots show that the waters at Locker Point and Urala Creek South are well mixed with no observed salinity stratification.

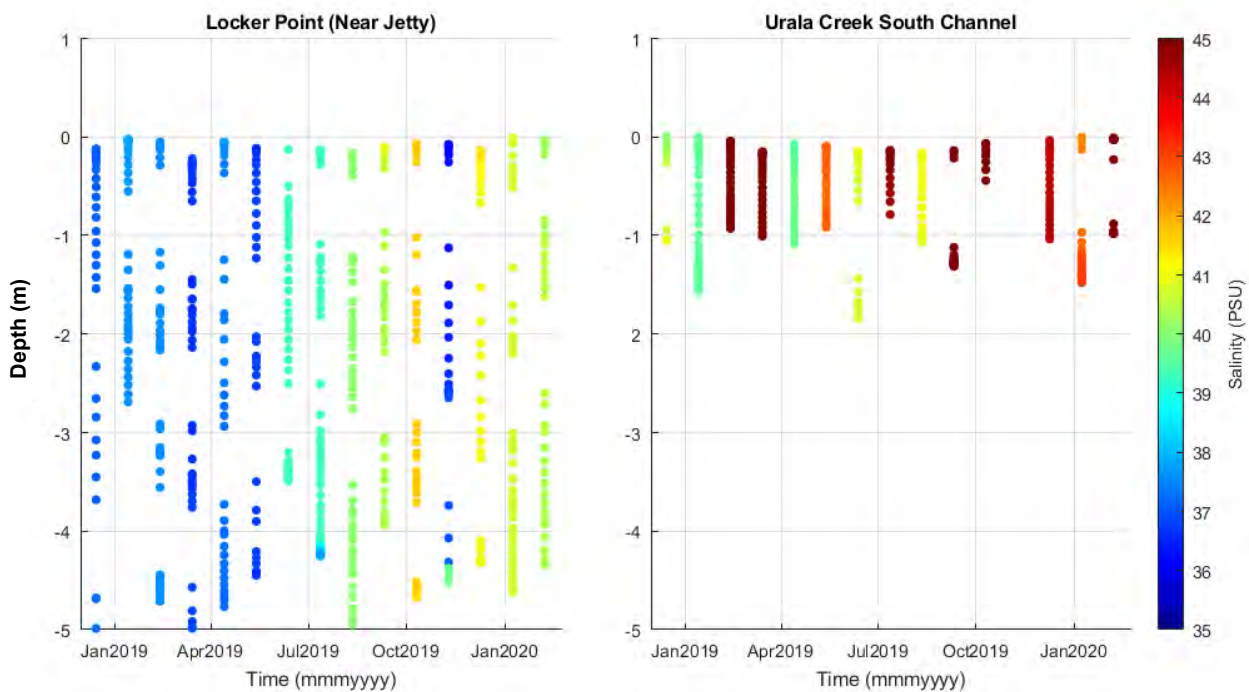


Figure 5-8 Salinity profiles measured at Locker Point and Urala Creek south channel

A timeseries of in-situ salinity data measured in practical salinity units (PSU) and laboratory results for total dissolved solids (TDS g/L) at Urala Creek South and Locker Point is provided in Figure 5-9. TDS is frequently used as a salinity indicator and has been plotted for context. The data is considered to be a reliable representation of salinity throughout the year. There is a less seasonal trend, compared to temperature, but there are still episodic drops and spikes in salinity.

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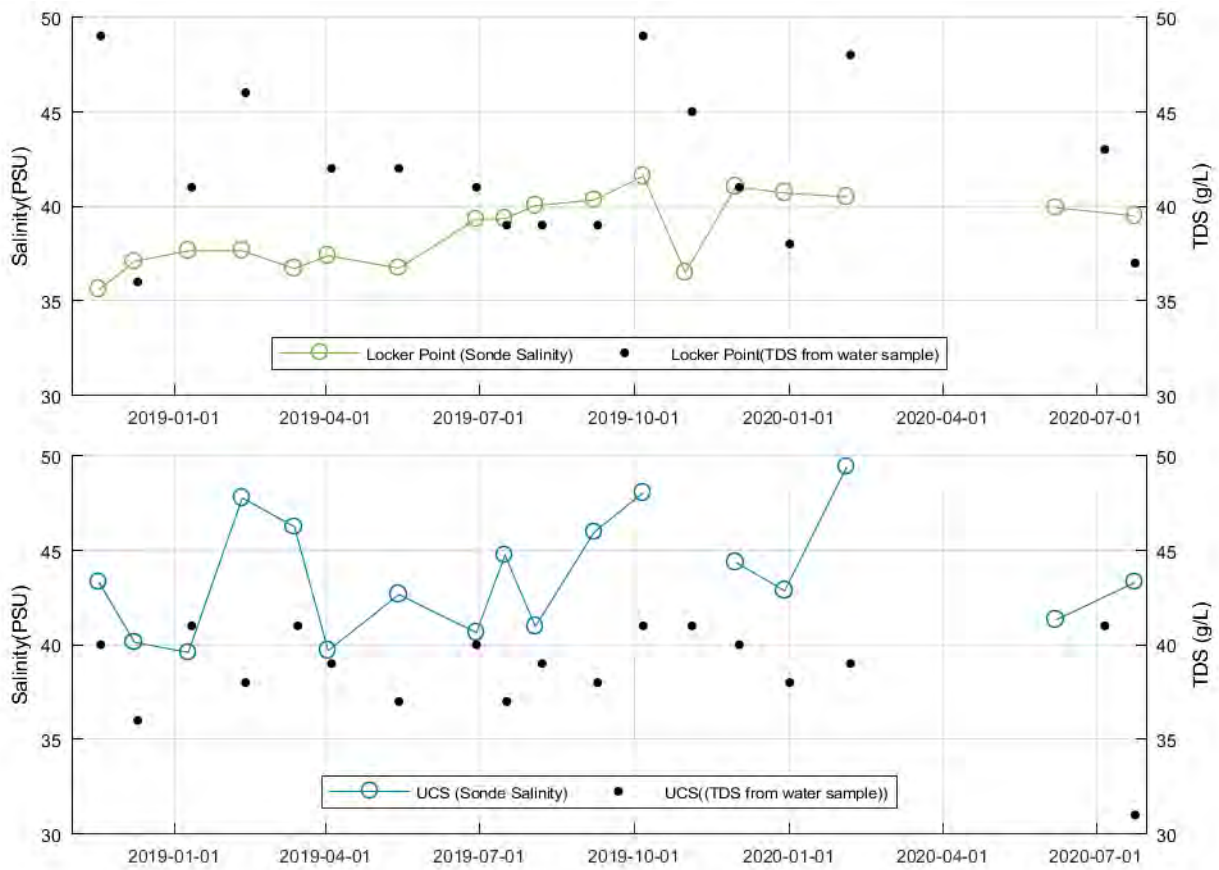


Figure 5-9 Timeseries of salinity and TDS at Urala Creek South and Locker point

For consistency, spatial plots of salinity have been presented for the same three months identified in the temperature analysis (i.e. July 2019, October 2019 and January 2020). The spatial maps are illustrated in Figure 5-10 to Figure 5-12. The sonde data presented on these figures was extracted from approximately 2 m below surface or from mid depth if the water depth was too shallow, whilst laboratory samples were taken in the top 1 m of the water column.

The spatial plots highlight the salinity variability over the coast with more saline waters closer to the creeks and less saline water off-shore.



Figure 5-10 Spatial map of Salinity 2 m below the surface in July 2019



Figure 5-11 Spatial map of Salinity 2 m below the surface in October 2019

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Figure 5-12 Spatial map of Salinity 2 m below the surface in January 2020

Water samples were analysed at the NATA accredited ARL laboratory and key results for Locker Point and Urala Creek South are summarised in Table 5-4. Data for all other sites are available in Appendix B which contains the ARL Laboratory reports.

Table 5-4 Conductivity and Total Dissolved Solids from water sample tests at Urala Creek South and Locker Point

Period	Locker Point (bottom)		Locker Point (surface)		Urala Creek South (bottom)		Urala Creek South (surface)	
	Cond (mS/cm)	TDS (mg/L)	Cond (mS/cm)	TDS (mg/L)	Cond (mS/cm)	TDS (mg/L)	Cond (mS/cm)	TDS (mg/L)
Nov 2018	55	41000	55	40000	64	48000	65	49000
Dec 2018	51	37000	50	36000	55	37000	55	36000
Jan 2019	55	42000	54	41000	57	41000	57	41000
Feb 2019	54	39000	55	38000	67	47000	67	46000
Mar 2019	44	42000	48	41000	-	-	59	51000
Apr 2019	55	39000	56	39000	59	41000	59	42000
May 2019	58	37000	57	37000	-	-	65	42000
Jun 2019	51	40000	52	40000	-	-	53	41000

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Period	Locker Point (bottom)		Locker Point (surface)		Urala Creek South (bottom)		Urala Creek South (surface)	
	Cond (mS/cm)	TDS (mg/L)	Cond (mS/cm)	TDS (mg/L)	Cond (mS/cm)	TDS (mg/L)	Cond (mS/cm)	TDS (mg/L)
Jul 2019	52	37000	52	37000	-	-	56	39000
Aug 2019	53	38000	53	39000	-	-	55	39000
Sep 2019	55	40000	55	38000	-	-	60	39000
Oct 2019	54	42000	52	41000	-	-	59	49000
Nov 2019	53	42000	54	41000	-	-	58	45000
Dec 2019	52	41000	52	40000	-	-	56	41000
Jan 2020	63	38000	63	38000	-	-	63	38000
Feb 2020	52	38000	52	39000	-	-	61	48000
6 Jul 2020 #1	58	39000	57	47000	-	-	61	42000
6 Jul 2020 #2	57	41000	58	41000	-	-	60	43000
24 Jul 2020 #1	55	32000	55	31000	-	-	60	37000
24 Jul 2020 #2	56	33000	56	33000	-	-	60	36000

5.4.3 Locker Point Baseline Salinity

Establishing baseline salinity levels at Locker Point is particularly important given this is the proposed location of the bitterns outfall and salinity is defined as the key physical chemical stressor within the bitterns discharge stream.

Salinity was monitored at Locker Point from December 2018 until October 2020 with both in-situ sonde probe readings (at 1 m depth) and samples (in the top 1 m) for NATA accredited laboratory analysis. The resulting data is presented in Table 5-5 and Figure 5-13 below. These data show that at Locker Point during the monitoring period:

- In-situ salinity ranged from 36.3 PSU to 41.6 PSU, with a median salinity of 40 PSU and an 80th percentile salinity of 40.7 PSU.
- In-situ Total Dissolved Solids (TDS) ranged from 35,621 to 40,155 mg/L, with a median TDS of 38,755 mg/L and an 80th percentile TDS of 39,456.
- Laboratory TDS ranged from 36,000 to 41,000 mg/L, with a median TDS of 39,000 mg/L and an 80th percentile TDS of 41,000 mg/L.

As shown in Figure 5-13 and Table 5-5 there was reasonably good agreement between the laboratory and in-situ TDS results. Laboratory TDS results are considered to be reasonably reliable given laboratory TDS was measured by a NATA accredited laboratory with appropriate quality controls using the gravimetric method whereby water samples are evaporated, and the remaining residue is weighed. This gravimetric analysis method is considered unlikely to be prone to significant error.

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On the basis that the laboratory TDS measurements (via gravimetric analysis) are considered to be reasonably reliable and do not vary from the in-situ monitoring results for TDS, it can be concluded that the in-situ salinity measurements in PSU form a reasonable baseline dataset at Locker Point for the monitoring period.

Table 5-5 In-situ and Laboratory Baseline Salinity at Locker Point

Month #	Year	Month	Sample Date	In-situ Salinity (PSU)	In-situ TDS (mg/L)	Laboratory TDS (mg/L)
1	2018	Dec	8/12/2018	37.12	36,336	36,000
2	2019	Jan	9/01/2019	37.65	36,905	41,000
3	2019	Feb	11/02/2019	37.64	36,899	38,000
4	2019	Mar	13/03/2019	36.70	36,122	41,000
5	2019	Apr	2/04/2019	37.41	36,726	39,000
6	2019	May	14/05/2019	36.74	35,976	37,000
7	2019	Jun	29/06/2019	39.33	38,194	40,000
8	2019	Jul	16/07/2019	39.33	38,192	37,000
9	2019	Aug	3/08/2020	40.03	38,795	39,000
11	2019	Sep	7/09/2019	40.57	39,264	38,000
12	2019	Oct	6/10/2019	41.60	40,155	41,000
13	2019	Oct	31/10/2019	36.30	35,621	41,000
14	2019	Nov	30/11/2019	41.03	39,757	40,000
15	2019	Dec	29/12/2019	40.69	39,573	38,000
16	2020	Feb	4/02/2020	40.35	39,184	39,000
17	2020	May	22/05/2020	40.41	39,137	41,000
18	2020	Jul	6/07/2020	39.95	38,740	41,000
19	2020	Aug	27/08/2020	40.83	39,478	39,000
20	2020	Sep	26/09/2020	39.98	38,770	39,000
21	2020	Oct	31/10/2020	40.73	39,451	41,000
Range				36.3 to 41.6	35,621 to 40,155	36,000 to 41,000
Median				40	38,755	39,000
80th Percentile				40.7	39,456	41,000

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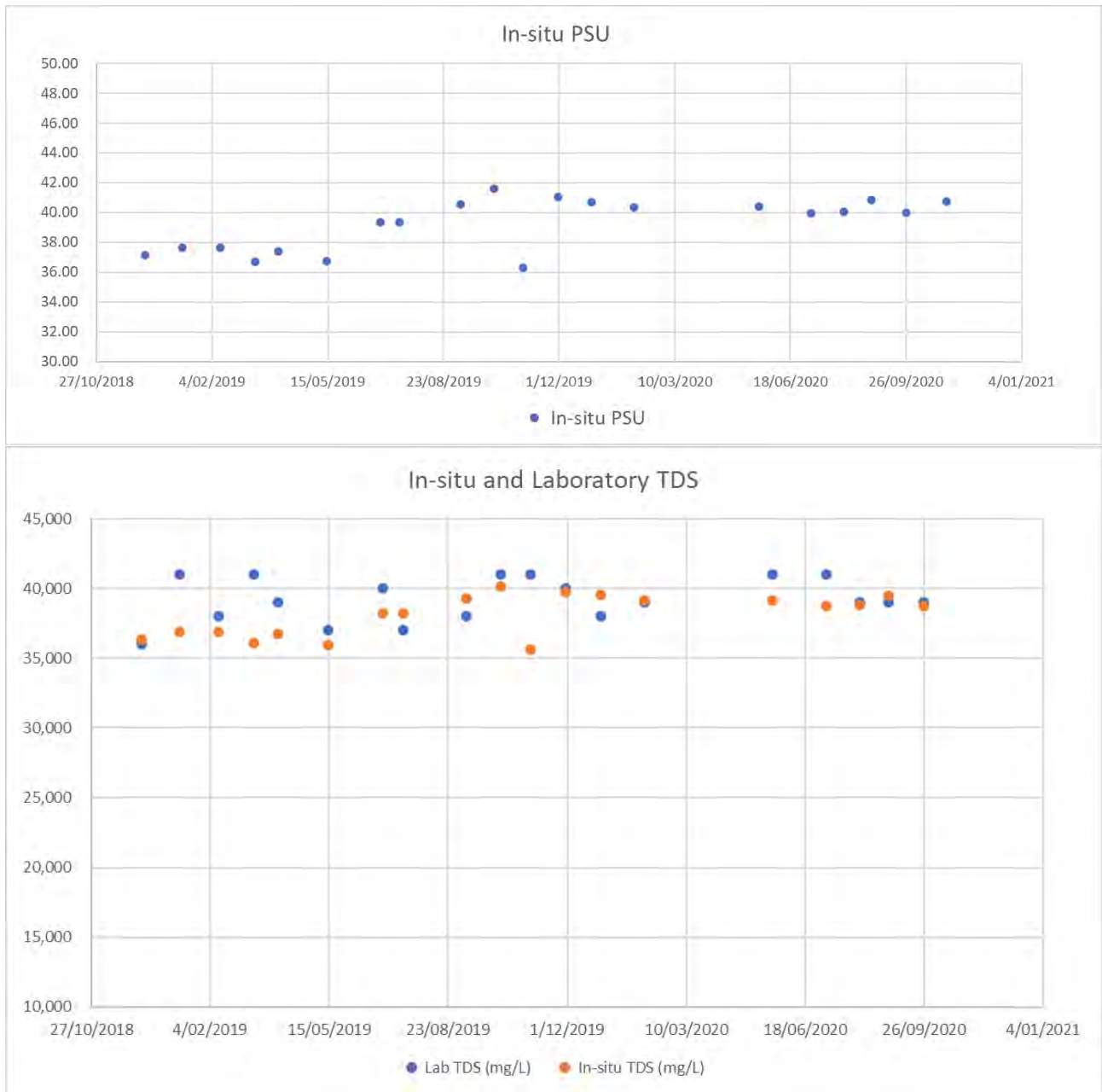


Figure 5-13 In-Situ and Laboratory Baseline Salinity Locker Point (PSU and TDS)

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5.5 Turbidity

5.5.1 In-situ Continuous Measurements

Turbidity data recorded by loggers at Locker Point and Urala Creek South is presented below. General turbidity characteristics at both sites were as follows:

- Turbidity in the region is predominantly determined by tidal flow over the shallow coast and through the creek channels, with additional impacts from wind/wave weather conditions. River runoff may temporarily affect nearshore turbidity with such influence being secondary to long-term background turbidity levels.
- Due to the lack of consistent rainfall, the area shows no distinguishable seasonal turbidity pattern as would occur in areas with greater seasonal rainfall/runoff/wave climate. There could be a seasonal wind effect, however the intermittent data makes this difficult to determine.
- The continuous measured turbidity at the Locker Point ranges from 1 NTU to over 30 NTU under different tidal phases (Figure 5-14, top), and may occasionally exceed 200 NTU for very limited time periods.
- Tidal currents appear to be the main driver of turbidity in Urala Creek South, as indicated by the diurnal turbidity variation in Figure 5-14, bottom. The measured turbidity increases from less than 5 NTU under neap tide conditions to over 30 NTU under spring tide conditions.
- In general, Locker Point is a more turbid environment than Urala Creek South.

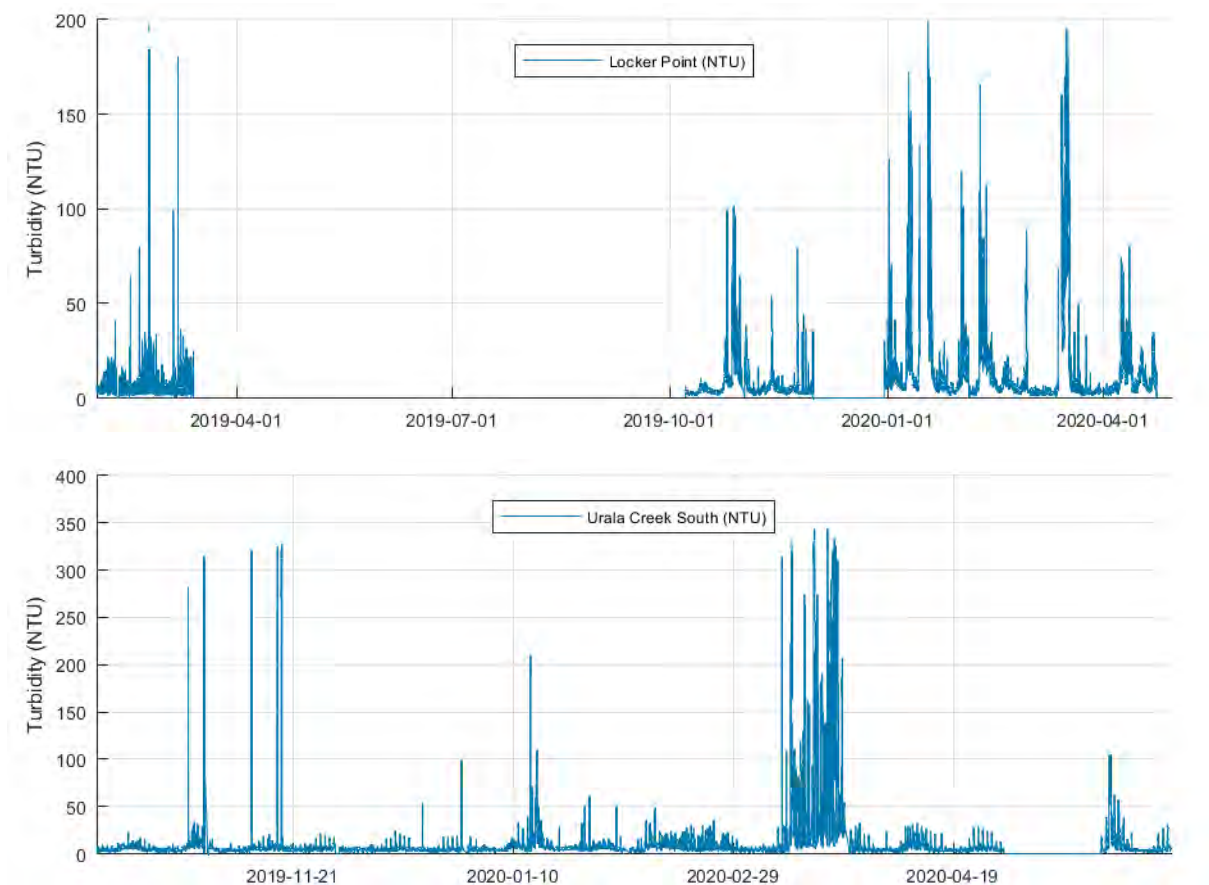


Figure 5-14 Turbidity (NTU) data measured at Locker Point (top) and Urala Creek South (bottom)

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5.5.2 Monthly In-situ Sonde Data

Monthly vertical profiles of turbidity at Locker Point and Urala Creek South are presented in Figure 5-15. This indicates:

- Turbidity generally increases with depth, with this trend being more noticeable at Locker Point with values ranging from 2 NTU at the surface to over 50 NTU closer to the bed. The data highlights that this is an extremely dynamic environment that experiences high turbidity fluctuations;
- The extremely high turbidity (>500NTU) recorded at the seabed in the profiles could be related to the instrument interacting with the seabed and disturbing sediments; and
- Reverse turbidity profiles (higher turbidity near the surface and lower turbidity near the seabed) are observed for some profiles. These can occur when a sediment laden freshwater plume is present.

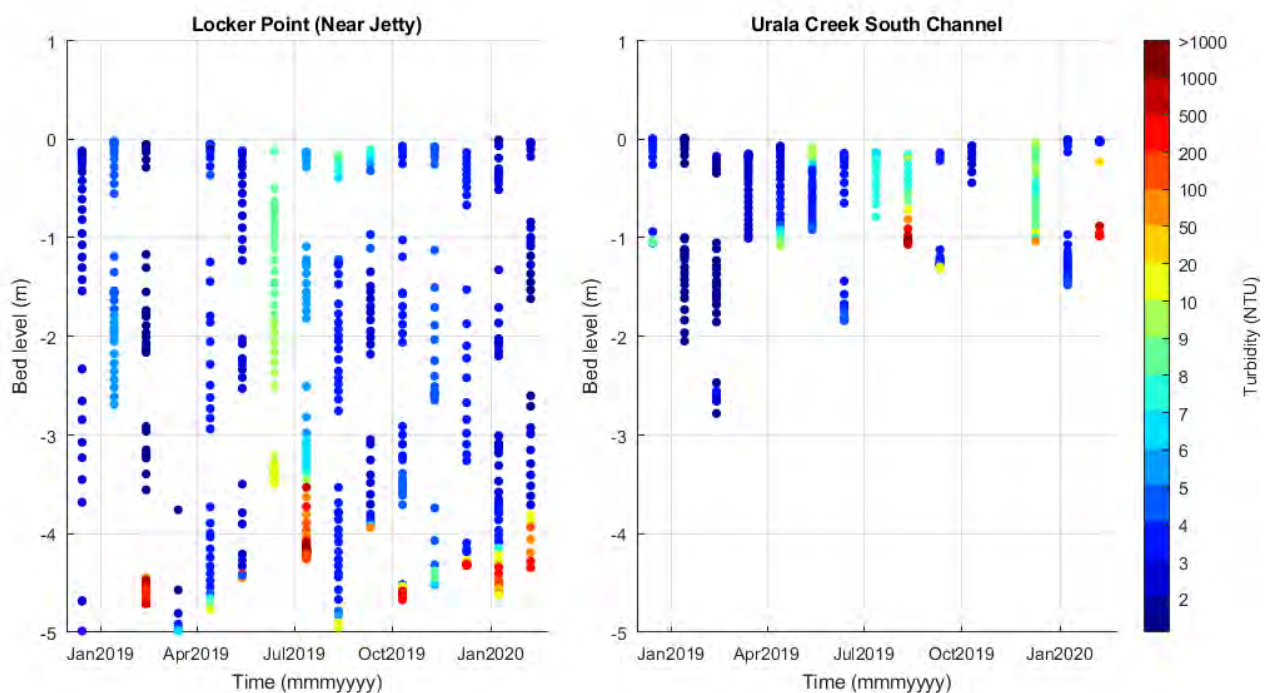


Figure 5-15 Turbidity (NTU) profiles measured at the Intake (Urala Creek South) and Outfall (Locker Point) locations

For consistency, spatial plots of turbidity have been presented for the same three months identified in the temperature analysis (i.e. July 2019, October 2019 and January 2020). The spatial maps are illustrated in Figure 5-16, Figure 5-17 and Figure 5-18.

The plotted in-situ sonde data were extracted from approximately 2 m below surface (from middle depth if water depth is too shallow). The profiles in Figure 5-15 highlight the vertical turbidity fluctuations, whereas the plots emphasise the turbidity variation horizontally across the coast, with more turbid water measured closer to the coastline.

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Figure 5-16 Spatial map of turbidity 2 m below the surface in July 2019



Figure 5-17 Spatial map of turbidity 2 m below the surface in October 2019

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Figure 5-18 Spatial map of turbidity 2 m below the surface in January 2020

5.5.3 Water Sampling Laboratory Data

Turbidity was monitored at Locker Point from December 2018 until February 2020 with both in-situ readings and samples for NATA accredited laboratory analysis. The resulting data is presented below.

At Locker Point during the monitoring period (Table 5-6):

- Laboratory Total Suspended Solids (TSS) ranged from 5 to 32 mg/L, with a median and 80th percentile of 8.5 and 16.4 mg/L respectively.
- Laboratory turbidity ranged from 0.6 to 8.3 NTU, with a median and 80th percentile of 1.55 and 2.98 NTU respectively.

At Urala Creek South during the monitoring period (Table 5-7):

- Laboratory TSS ranged from 6 to 16 mg/L, with a median and 80th percentile of 9.5 and 13.4 mg/L respectively.
- Laboratory turbidity ranged from 0.7 to 6.7 NTU, with a median and 80th percentile of 2.1 and 3.56 NTU respectively.



Table 5-6 Laboratory Baseline Turbidity Results Locker Point

Stratum	Sample Date	Total Suspended Solids (mg/L)	Turbidity (NTU)
	<i>PQL</i>	5	0.1
Bottom	18/11/2018	<5	1.2
Top	18/11/2018	<5	1.2
Bottom	8/12/2018	<5	1.6
Top	8/12/2018	<5	0.9
Bottom	9/01/2019	8	0.9
Bottom	9/01/2019	7	1.7
Top	9/01/2019	15	1.8
Top	9/01/2019	<5	1.5
Bottom	15/03/2019	<5	2.9
Top	15/03/2019	<5	0.8
Bottom	2/04/2019	18	1.3
Top	2/04/2019	16	1.3
Bottom	14/05/2019	32	2
Top	14/05/2019	24	0.9
Bottom	29/06/2019	7	7
Top	29/06/2019	<5	5.3
Bottom	16/07/2019	9	8.3
Bottom	16/07/2019	6	1
Top	16/07/2019	7	5.1
Top	16/07/2019	5	1.4
Bottom	7/09/2019	5	0.7
Bottom	7/09/2019	20	3
Top	7/09/2019	<5	1.3
Top	7/09/2019	12	3.1
Bottom	6/10/2019	6	1
Top	6/10/2019	8	1.4
Bottom	30/11/2019	<5	2.5
Top	30/11/2019	6	3.9
Bottom	29/12/2019	10	1.6
Top	29/12/2019	9	0.6
Bottom	4/02/2020	<5	1.7
Top	4/02/2020	<5	1.7
Statistics	Max	32	8.3
	Min	5	0.6
	Median	8.5	1.55
	80th percentile	16.4	2.98

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Table 5-7 Laboratory Baseline Turbidity Results Urala Creek South

Stratum	Date	Total Suspended Solids (mg/L)	Turbidity (NTU)
	<i>PQL</i>	5	<i>0.1</i>
Bottom	9/01/2019	11	0.7
Bottom	9/01/2019	6	3.4
Top	9/01/2019	<5	0.9
Top	9/01/2019	8	3.4
Top	15/03/2019	<5	2.5
Bottom	3/04/2019	16	2.1
Top	3/04/2019	15	2.1
Top	14/05/2019	11	2
Top	30/06/2019	6	2
Top	16/07/2019	10	6.7
Top	16/07/2019	8	3.8
Top	8/09/2019	<5	1.1
Top	8/09/2019	14	3.1
Top	6/10/2019	<5	0.9
Top	30/11/2019	<5	3.9
Top	29/12/2019	9	1
Top	4/02/2020	6	3.6
Statistics	Min	6	0.7
	Max	16	6.7
	Median	9.5	2.1
	80th percentile	13.4	3.56

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5.6 Nitrogen, Phosphorus, Carbon and Chlorophyll – Monthly Water Sampling

Monthly water sampling laboratory analysis results for nitrogen, phosphorus, dissolved organic carbon and chlorophyll are displayed as timeseries in Figure 5-19 and Figure 5-20 whilst a statistical summary is provided in Table 5-8.

Total Nitrogen concentrations ranged between 0.2 mg/L (the laboratory Limit of Reporting (LOR)) and 1.1 mg/L. The results in Figure 5-19 indicate that nitrogen is primarily Total Kjeldahl Nitrogen, which is comprised of organic nitrogen and ammonia. Ammonia was also measured but was generally below the LOR which indicates that nitrogen is largely organic. The high organic nitrogen content is likely a mixture of particulate organic nitrogen and dissolved organic nitrogen, the latter of which is largely refractory.

There are two significant pulses (January 2019 and August 2019) in nitrogen observed throughout the year, however these do not correspond to rainfall events and are likely related to upwelling. Several sources of rainfall data were assessed including measured data at Onslow and data extracted at two points near Urala Creek from the Climate Forecast System (CFS), neither of which indicated rainfall. Wind data during the week preceding the January nitrogen pulse indicated strong south-westerly winds. These winds could weaken the Leeuwin current and strengthen the Ningaloo current whilst also inducing Ekman transport resulting in the upwelling of nutrient rich waters. The August pulse, which was more moderate than January but still significant, was accompanied by strong winds from the northeast. Oceanographic processes and coastal upwelling, including additional interpretation this data, are provided in *Nutrient Pathways Assessment and Modelling* (Water Technology 2021).

Throughout the year phosphorus, carbon and chlorophyll-a remained consistently low and frequently at the LOR, as displayed in Figure 5-20. The Urala Creek South site consistently exhibited higher dissolved organic carbon levels which could be related to algal mats, and to a lesser degree mangroves, acting as a source of dissolved organic matter.

The monitoring and statistical analysis in Table 5-8 indicates that the marine waters are nitrogen limited, as TN:TP ratios ranged from 18-50:1. The DIN:TP ratio can be more meaningful metric to assess nitrogen and/or phosphorus limitation and the ratios derived from the monitoring data ranged from 2-10:1, which also indicates nitrogen limitation.

Figure 5-21 shows the nitrogen concentration in the samples as box plots. This figure highlights that the offshore sites had slightly lower nitrogen concentrations, with the area around Locker Point and Locker Island recording higher levels. Median nitrogen concentrations in Urala Creek North and South were quite similar for the nearshore and channel locations. Concentrations at the bottom were slightly higher than those recorded at the surface, likely due to higher particulate content in water closer to the seabed. It should be noted that some sampling locations were not plotted as they had less than six sampling events.

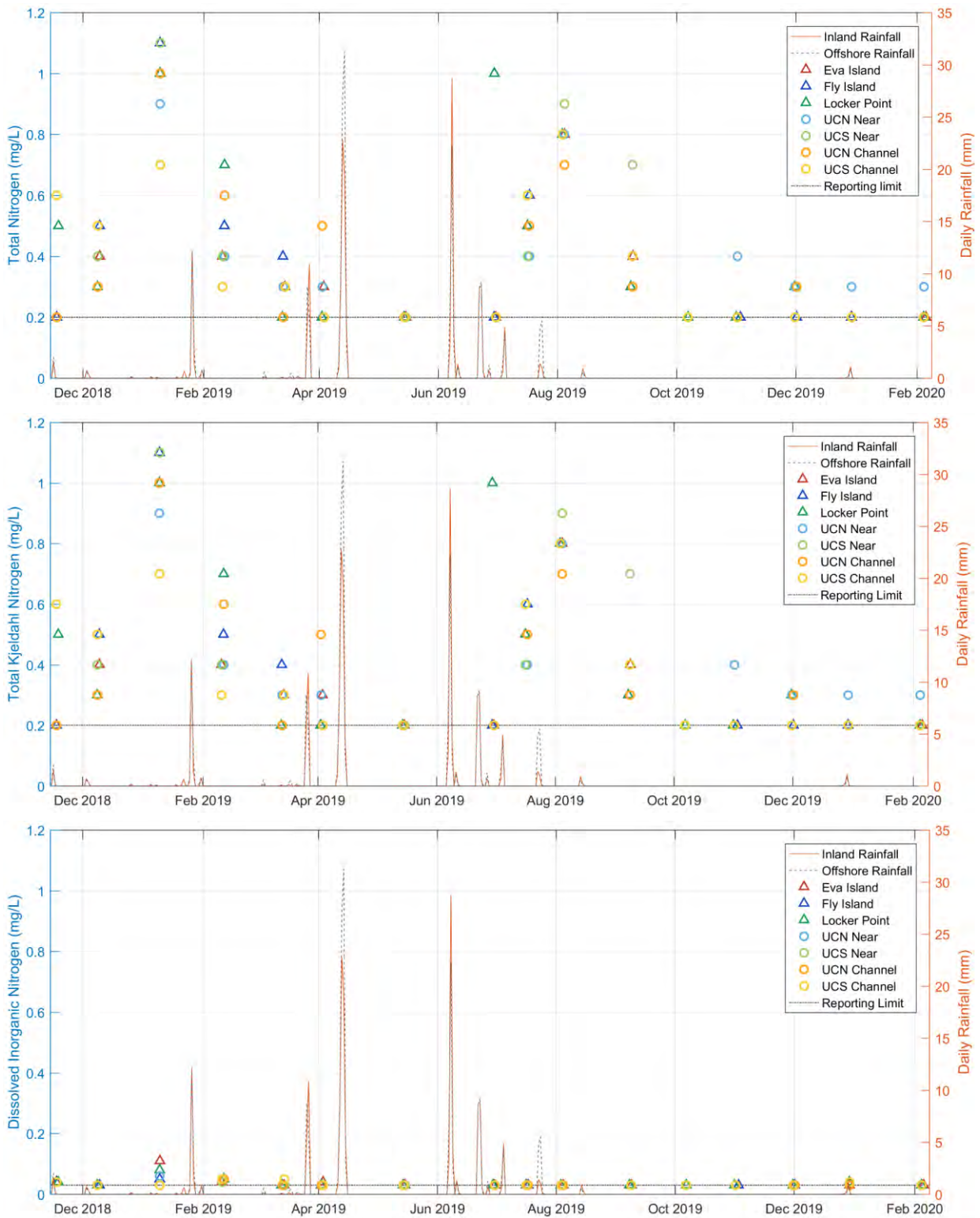


Figure 5-19 UWA monthly monitoring: Total Nitrogen, Total Kjeldahl Nitrogen, Dissolved Inorganic Nitrogen

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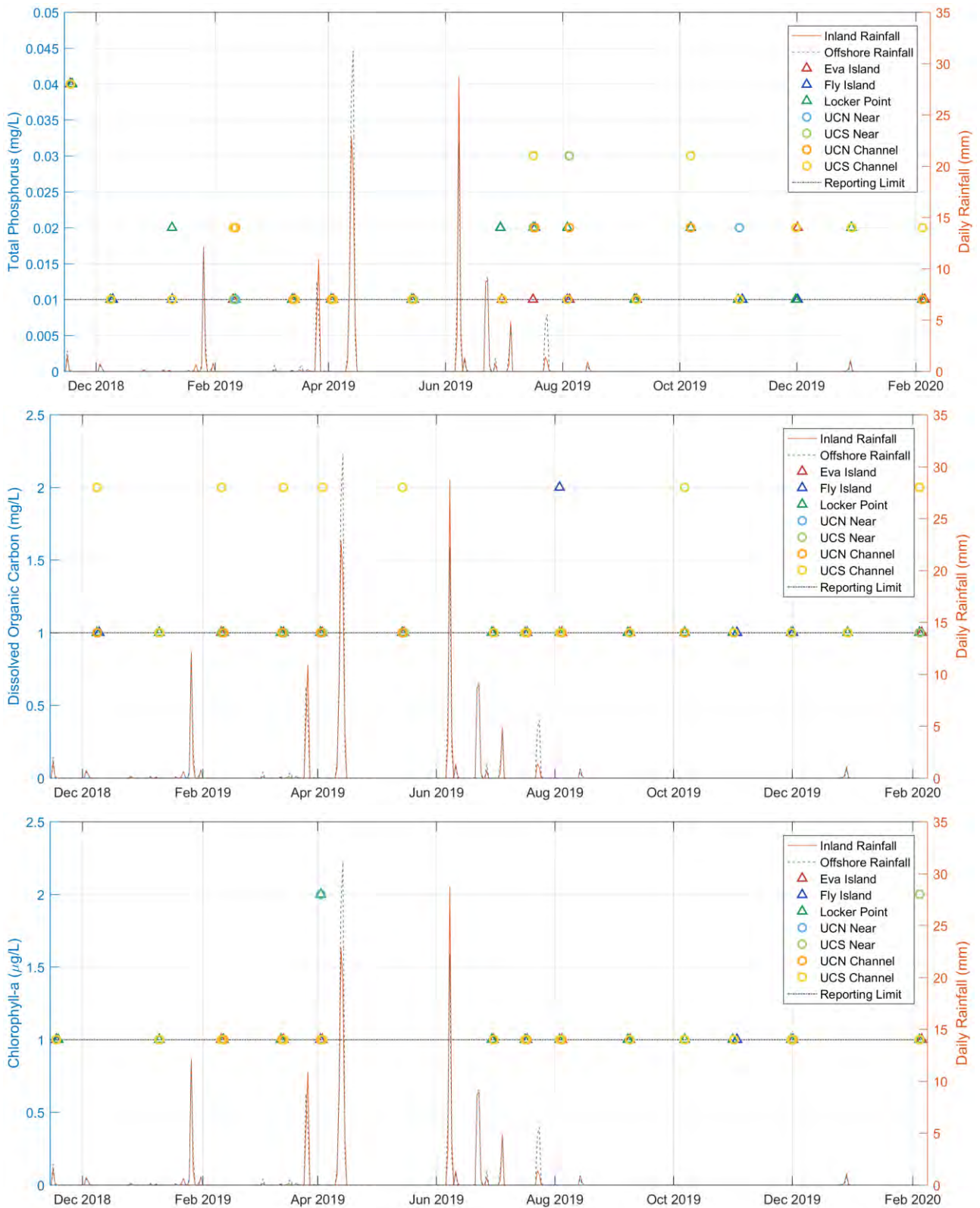


Figure 5-20 UWA monthly monitoring: Total Phosphorus, Dissolved Organic Carbon and Chlorophyll

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Table 5-8 Statistical summary of UWA Monthly monitoring results

Site	Total Nitrogen			TKN			DIN			TP			TOC			DOC			Chla			
	50 th	80 th	Avg.	50 th	80 th	Avg.	50 th	80 th	Avg.	50 th	80 th	Avg.	50 th	80 th	Avg.	50 th	80 th	Avg.	50 th	80 th	Avg.	
Eva Island Bottom	0.20	0.45	0.36	0.20	0.45	0.36	0.03	0.03	0.04	0.01	0.02	0.02	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Eva Island Top	0.30	0.45	0.37	0.30	0.45	0.37	0.03	0.03	0.04	0.01	0.02	0.01	1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Fly Island Bottom	0.20	0.53	0.36	0.20	0.53	0.36	0.03	0.03	0.03	0.02	0.02	0.02	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Fly Island Top	0.20	0.53	0.38	0.20	0.53	0.38	0.03	0.03	0.04	0.01	0.02	0.01	1.0	1.0	1.1	1.0	1.0	1.1	1.0	1.0	1.0	1.0
Locker Island Bottom	0.40	0.60	0.47	0.40	0.60	0.47	0.03	0.03	0.04	0.01	0.02	0.02	1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Locker Island Top	0.30	0.66	0.39	0.30	0.66	0.39	0.03	0.03	0.04	0.01	0.02	0.02	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Locker Point Bottom	0.50	0.80	0.46	0.50	0.80	0.46	0.03	0.03	0.04	0.01	0.02	0.02	1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Locker Point Top	0.30	0.73	0.46	0.30	0.73	0.46	0.03	0.03	0.04	0.01	0.02	0.02	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1
Rocky Point Bottom	0.20	0.62	0.37	0.20	0.62	0.37	0.03	0.94	1.89	0.01	0.01	0.01	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Rocky Point Top	0.20	0.65	0.39	0.20	0.65	0.39	0.03	0.03	0.05	0.01	0.03	0.02	1.0	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
UCN Channel Bottom	0.25	0.52	0.35	0.25	0.52	0.35	0.03	0.03	0.03	0.01	0.02	0.02	1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
UCN Channel Top	0.30	0.55	0.37	0.30	0.55	0.37	0.03	0.03	0.03	0.01	0.02	0.02	1.0	1.1	1.2	1.0	1.0	1.1	1.0	1.0	1.0	1.0
UCN Nearshore Bottom	0.30	0.85	0.61	0.30	0.85	0.61	0.03	0.03	0.03	0.01	0.02	0.02	1.0	1.7	1.2	1.0	1.7	1.2	1.0	1.0	1.0	1.0
UCN Nearshore Top	0.30	0.40	0.38	0.30	0.40	0.38	0.03	0.03	0.05	0.02	0.02	0.02	1.0	1.3	1.2	1.0	1.5	1.2	1.0	1.0	1.0	1.0
UCS Channel Bottom	0.30	0.56	0.37	0.30	0.56	0.37	0.03	0.03	0.03	0.01	0.03	0.02	1.0	1.5	1.2	1.0	1.0	1.1	1.0	1.0	1.0	1.0
UCS Channel Top	0.25	0.60	0.36	0.25	0.60	0.36	0.03	0.03	0.03	0.01	0.02	0.02	1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.1
UCS Nearshore Bottom	0.50	1.45	0.80	0.50	1.45	0.80	0.03	0.03	0.03	0.01	0.03	0.02	1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.2
UCS Nearshore Top	0.20	0.55	0.39	0.20	0.55	0.39	0.03	0.03	0.04	0.01	0.02	0.02	2.0	2.0	1.7	1.0	2.0	1.4	1.0	1.0	1.0	1.0
UCS Offshore Bottom	0.25	1.30	0.58	0.25	1.30	0.58	0.03	0.03	0.04	0.01	0.02	0.02	2.0	2.0	1.6	1.0	2.0	1.5	1.0	1.0	1.0	1.0
UCS Offshore Top	0.30	0.53	0.39	0.30	0.53	0.39	0.03	0.03	0.05	0.01	0.03	0.02	1.0	1.5	1.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0

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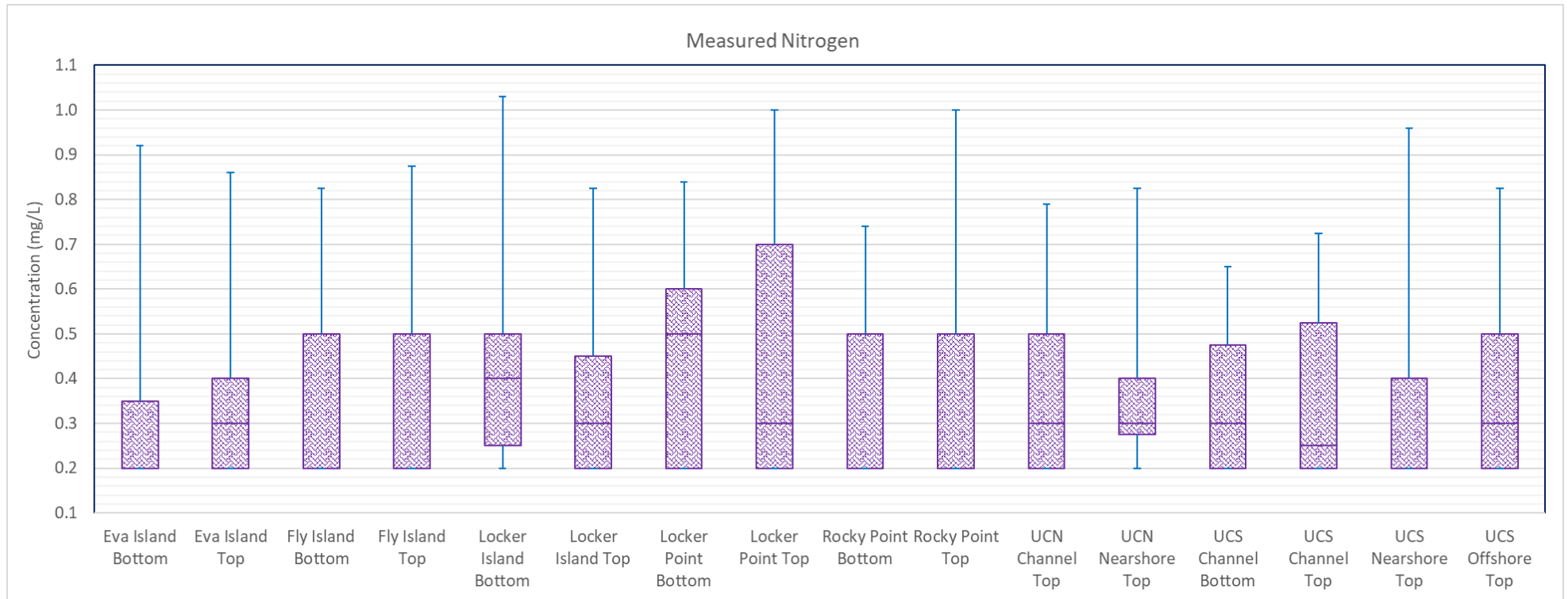


Figure 5-21 Total Nitrogen boxplot



5.7 Metals – Monthly Water Sampling

5.7.1 Locker Point Baseline Dissolved Metals

Establishing baseline dissolved metals levels at Locker Point is particularly important given this is the proposed location of the bitterns outfall and naturally occurring metals (from the intake seawater) are defined as the key toxicants within the bitterns discharge stream.

Dissolved metals in water were monitored at Locker Point from December 2018 until February 2020 with samples for NATA accredited laboratory analysis. The resulting data is presented in Table 5-9 below.

These data show that at Locker Point during the monitoring period:

- Most of the metals analysed were below the recommended Environmental Quality Criteria (EQC) specified for the protection of North West Shelf ecosystems (99% species protection levels for all metals, except cobalt which is set at 95% species protection) (Wenziker et al., 2006), (EPA, 2016), (ANZG, 2018).
- Aluminium exceeded the ANZG (2018) low reliability screening level of 0.0005 mg/L on two occasions. However, it should be noted that the Laboratory Practical Quantitation Level (PQL) was set above this this screening level of 0.0005 mg/L, with a PQL of 0.01 mg/L. This is the lowest PQL that can be achieved by the laboratories engaged, without additional onerous laboratory validation work which is considered not be necessary given the proposed bitterns discharge characteristics.
- A recent study of aluminium combining chronic biological effects data generated over several years with toxicity data from the open literature to construct species sensitivity distributions (SSDs) has enabled the computation of water quality guidelines for aluminium. An EQC concentration of 0.002 mg/L was derived for a 99% species protection level in tropical waters (van Dam, Trenfield, Streten, Hardfard, Parry and van Dam, 2018). Aluminium monitoring for this project exceeded this EQC of 0.002 mg/L on two occasions. However, it should be noted that the Laboratory PQL was set above this this EQC level of 0.002 mg/L, with a PQL of 0.01 mg/L as described above.
- Zinc exceeded the ANZG (2018) EQC (99% species protection level) of 0.007 mg/L on two occasions.
- Copper exceeded the ANZG (2018) EQC (99% species protection level) of 0.0003 mg/L on two occasions. However, it should be noted that the Laboratory PQL was set above this EQC level of 0.003 mg/L, with a PQL of 0.001 mg/L. A PQL of 0.0003 mg/L can be achieved by the laboratory engaged and further monitoring using this lower PQL was conducted as described in Section 9.



Table 5-9 Locker Point Baseline dissolved Metals Water Quality Results (mg/L)

PQL	Metal (mg/L)	Aluminium 0.01#	Manganese 0.01	Vanadium 0.01	Zinc 0.005	Arsenic 0.001	Chromium 0.001	Cobalt 0.001#	Copper 0.001	Lead 0.001	Nickel 0.001	Cadmium 0.0001	Mercury 0.0001	Selenium 0.001
Stratum	Date													
Bottom	8/12/2018	<0.01	<0.01	<0.01	0.01	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Top	8/12/2018	<0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Bottom	9/01/2019	<0.01	<0.01	<0.01	<0.005	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Bottom	9/01/2019	<0.01	<0.01	<0.01	<0.005	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Top	9/01/2019	<0.01	<0.01	<0.01	<0.005	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Top	9/01/2019	<0.01	<0.01	<0.01	<0.005	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Bottom	15/03/2019	<0.01	<0.01	<0.01	<0.005	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Top	15/03/2019	<0.01	<0.01	<0.01	<0.005	0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Bottom	2/04/2019	<0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Top	2/04/2019	<0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Bottom	14/05/2019	<0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Top	14/05/2019	0.05	<0.01	<0.01	0.016	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Bottom	29/06/2019	0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Top	29/06/2019	<0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	0.001
Bottom	16/07/2019	<0.01	<0.01	<0.01	0.006	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Bottom	16/07/2019	<0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Top	16/07/2019	<0.01	<0.01	<0.01	0.006	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Top	16/07/2019	<0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Bottom	7/09/2019	<0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Bottom	7/09/2019	<0.01	<0.01	<0.01	0.006	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Top	7/09/2019	<0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Top	7/09/2019	<0.01	<0.01	<0.01	0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Bottom	6/10/2019	<0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Top	6/10/2019	<0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Bottom	30/11/2019	<0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Top	30/11/2019	<0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Bottom	29/12/2019	<0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Top	29/12/2019	<0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Bottom	4/02/2020	<0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
Top	4/02/2020	<0.01	<0.01	<0.01	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001
ANZG (2018) EQC		0.0005*	0.08	0.05	0.007	0.0023	0.0001	0.001	0.0003	0.0022	0.007	0.0007	0.0001	0.003
Van Dam et. al. (2018) EQC		0.002**												

Table Notes:

- EQC = Environmental Quality Criteria
- PQL = Practical Quantitation Limit, # = PQL set above EQC
- ANZG (2018) EQCs are set at 99% species protection level, except cobalt which is set at 95% species protection level in accordance with EPA, 2016.
- *ANZG (2018) does not provide a 99% species protection level for Aluminium (0.0005 mg/L is provided as a low reliability screening level by ANZG, 2018).
- **van Dam et. al. (2018) have proposed a 99% species protection level for Aluminium of 0.002 mg/L



6 FEBRUARY, MAY, AUGUST AND OCTOBER 2019 - AECOM – CREEK WATER QUALITY MONITORING

6.1 Summary

AECOM undertook several targeted sampling events throughout 2019. Throughout the year nutrient concentrations were measured in Urala Creek South, Urala Creek North and a southern sub creek as shown in Figure 6-1. The nutrient surveys conducted in February 2019 and October 2019 targeted six sites across Urala Creek South and North, whilst during the August survey two sub-creeks were monitored over two days, with hourly water samples collected. Additionally, an intertidal survey was undertaken in May 2019.

Figure 6-1 presents the monitoring locations for the nutrient and sub-creek surveys.

Table 6-1 Creek Water Quality Monitoring Summary

Date	Description	Sites
3 - 6 February 2019	Nutrient Survey	UCN L, UCN M, UCN U, UCS L, UCS M, UCS U
30 – 31 August 2019 1 September 2019	Sub-creek survey	SC1, SC2
22 – 25 October 2019	Nutrient Survey	UCN L, UCN M, UCN U, UCS L, UCS M, UCS U
May 2019	Intertidal Survey	Intertidal survey

Additional detail regarding analytes, methodology and timing is provided in the subsequent sections.

Depth profiles were also undertaken during the February, August, and October surveys. They are displayed in Appendix C.



Figure 6-1 AECOM monitoring sites

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6.2 Nutrient Surveys

6.2.1 Methodology

The following detail regarding sampling methodology has been taken from the sampling and analysis plan developed by AECOM (2019). Samples were collected in 20 litre jerry cans over the side of the survey vessel. The vessel was positioned such that it was down current of the sample locations (see Figure 6-1 for locations).

The sampling container was pushed to a depth of approximately 20 cm below the water surface and the cap unscrewed to allow the bottle to fill. The cap was replaced and, if a smaller sampling container was being used, the bottle retrieved and emptied into the 20-litre jerry can on board the survey vessel. This was repeated until the jerry can was full.

Bulk water samples were then transported to the main survey vessel for subsampling. Where a triplicate sample was collected, three 20 litre jerry cans were filled and sub-sampled separately.

Subsamples were taken from the bulk sample for analysis at the laboratory as soon as possible after collection. Sub-sampling involved filtering some samples with a syringe filter, while other samples were transferred directly into the laboratory provided jars. Filtering, sample volume and sample container requirements are provided in Table 2-1.

Table 6-2 Analytical parameters, sample volumes, container type, preservation and holding times for nutrients in water samples

Parameter	LOR (mg/L)	Sample volume and Bottle	Treatment / Preservation	Holding time
Total N	0.05	2 x 125 mL HDPE bottle	Unfiltered / Freeze	30 days
Total P	0.005			
Ammonia	0.003	2 x 10mL Polypropylene tube	Filtered* / Freeze	
Nitrate+Nitrite	0.002			
Phosphate	0.002			
Total Organic Carbon (TOC)	0.6	1 x 125mL HDPE bottle	Unfiltered / Freeze	
Total Carbon (TC)	0.6			
Total Dissolved N	0.05	2 x 125 mL HDPE bottle	Filtered* / Freeze	
Total Dissolved P	0.005			
Dissolved Organic Carbon (TOC)	0.6	1 x 125mL HDPE bottle	Filtered* / Freeze	
Particulate Organic Carbon	0.6	1 x GF/C filter paper	Fold filter paper in quarters, wrap in unused filter paper and put in provided envelope. / Freeze.	
Total Suspended Solids (TSS)	-			
Particulate N	0.05			
Particulate P	0.005	1 x GF/C filter paper		

* Filtered with a syringe filter



6.2.2 Timing

Two surveys were undertaken, the first from the 3rd to the 7th of February 2019 and the second from the 22nd to the 25th of October 2019. Water levels during each survey are displayed in Figure 6-2 and Figure 6-3. The February survey was undertaken during a spring tide, however water levels appear slightly depressed during the survey compared to a normal spring tide. The October survey was undertaken during a clear neap tidal cycle.

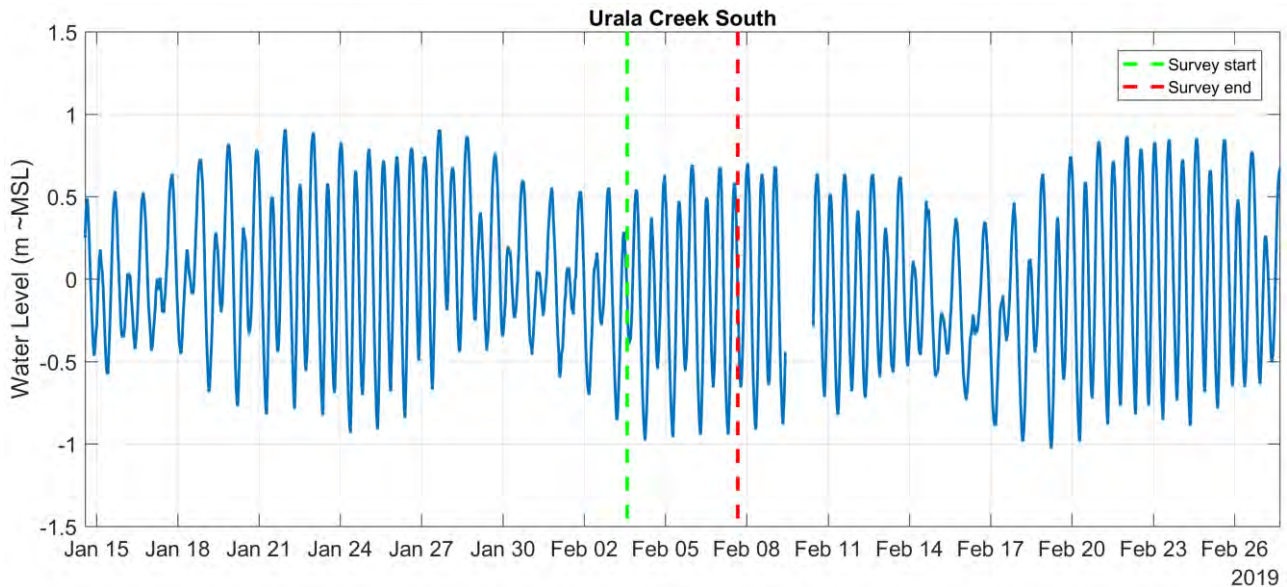


Figure 6-2 Water levels during the February 2019 spring tide survey

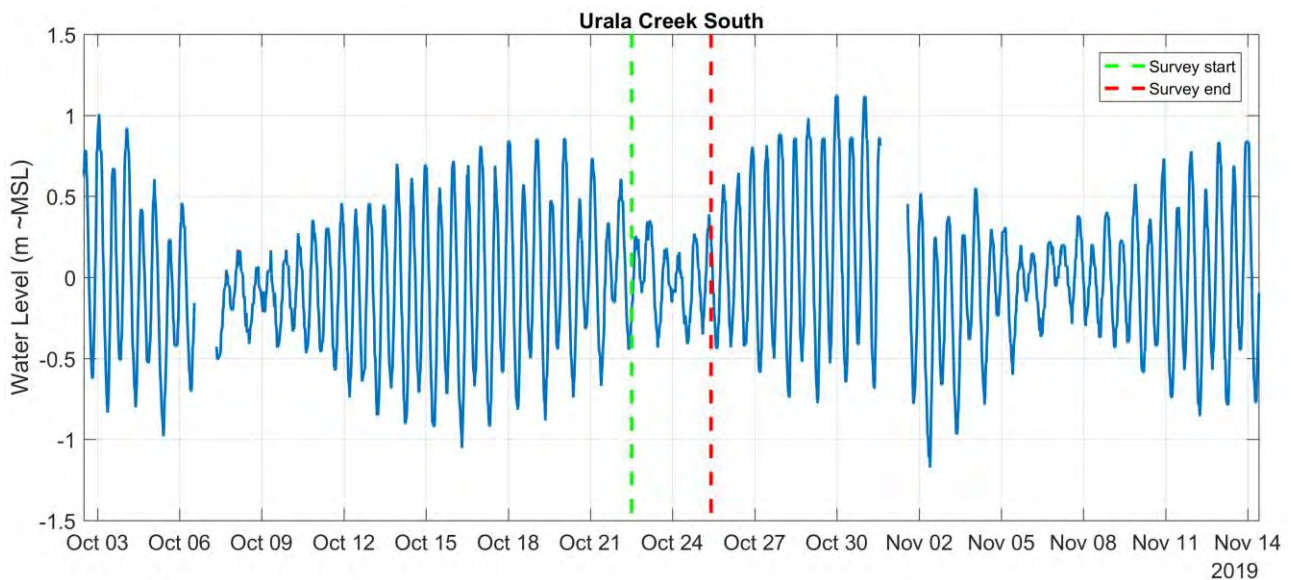


Figure 6-3 Water levels during the October 2019 Neap tide Survey

Samples were collected at each of the six sites during both a flood and ebb tide.

6.2.3 Results

The February 2019 monitoring results for total nitrogen, particulate nitrogen and dissolved inorganic nitrogen are displayed in Figure 6-4 to Figure 6-6, respectively. On the figures when water levels are increasing this is a flood tide and when they are decreasing this is an ebb tide.

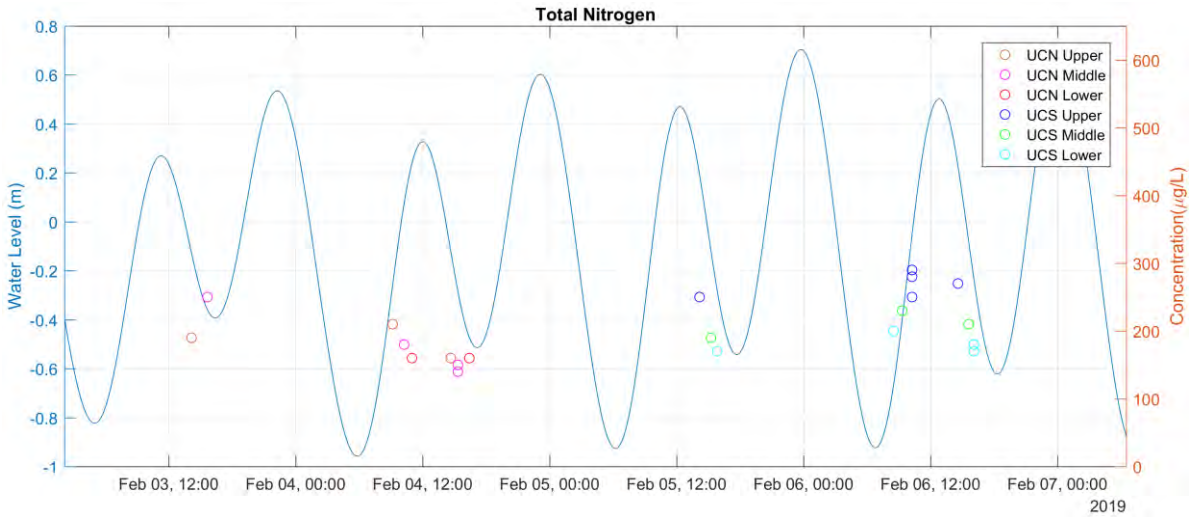


Figure 6-4 February 2019 total nitrogen

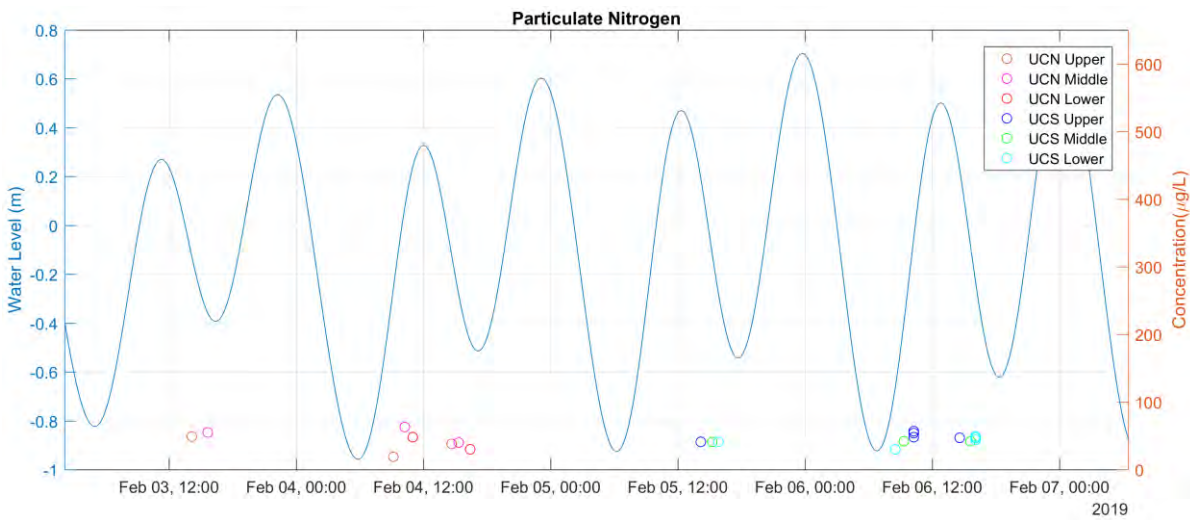


Figure 6-5 February 2019 particulate nitrogen

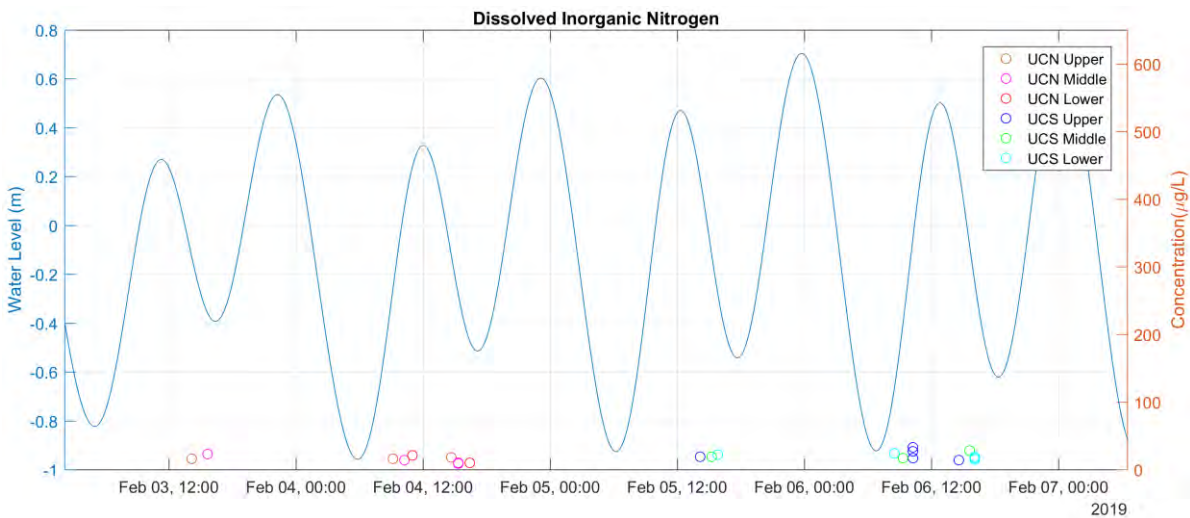


Figure 6-6 February 2019 dissolved inorganic nitrogen

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The February 2019 results for total phosphorus and particulate phosphorus are illustrated in Figure 6-7 to Figure 6-8.

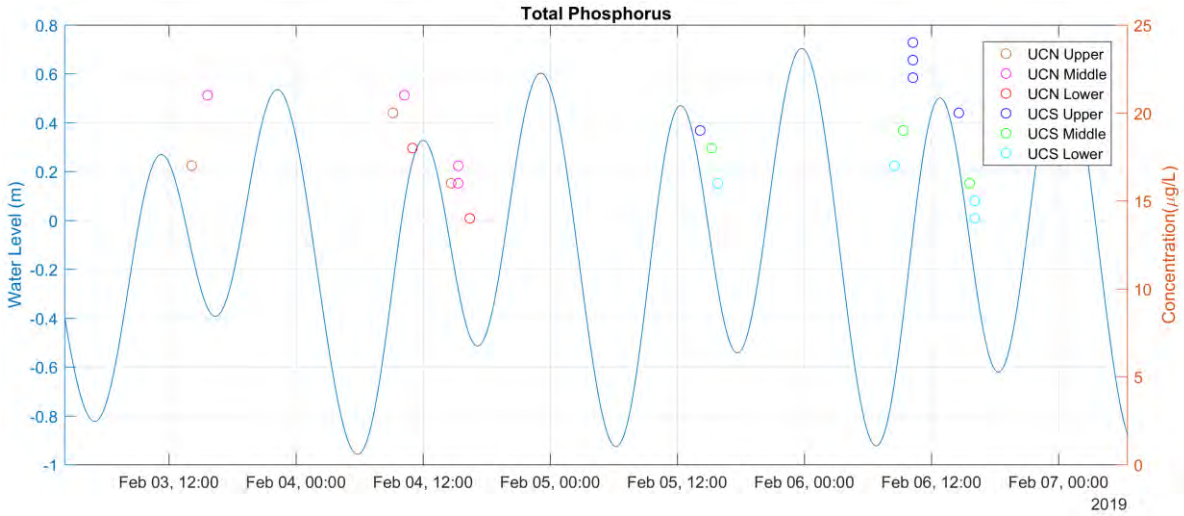


Figure 6-7 February 2019 total phosphorus

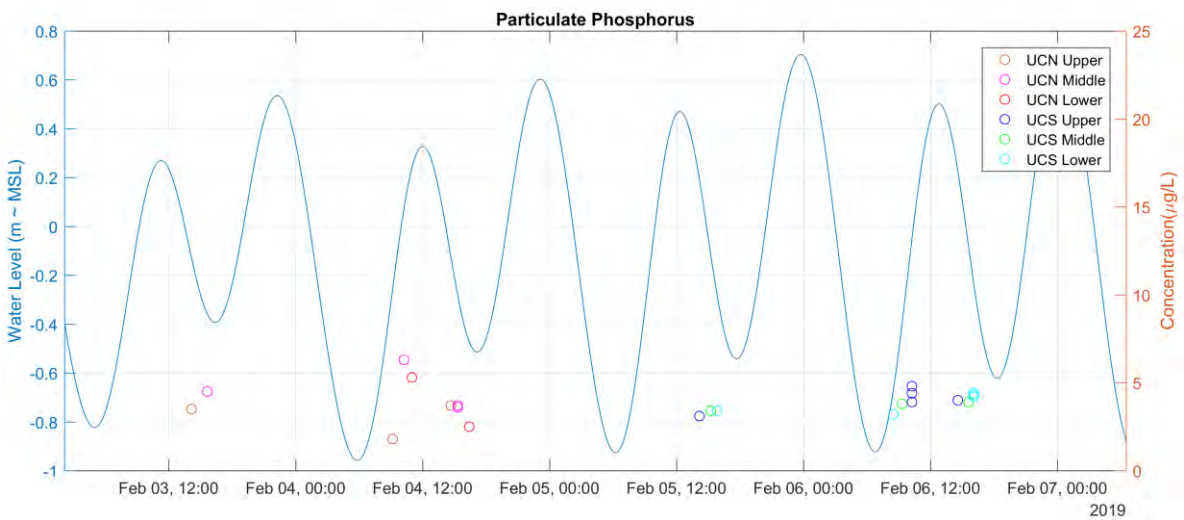


Figure 6-8 February 2019 particulate phosphorus

The February 2019 monitoring results for total carbon and total purgeable carbon are displayed Figure 6-9 to Figure 6-10.

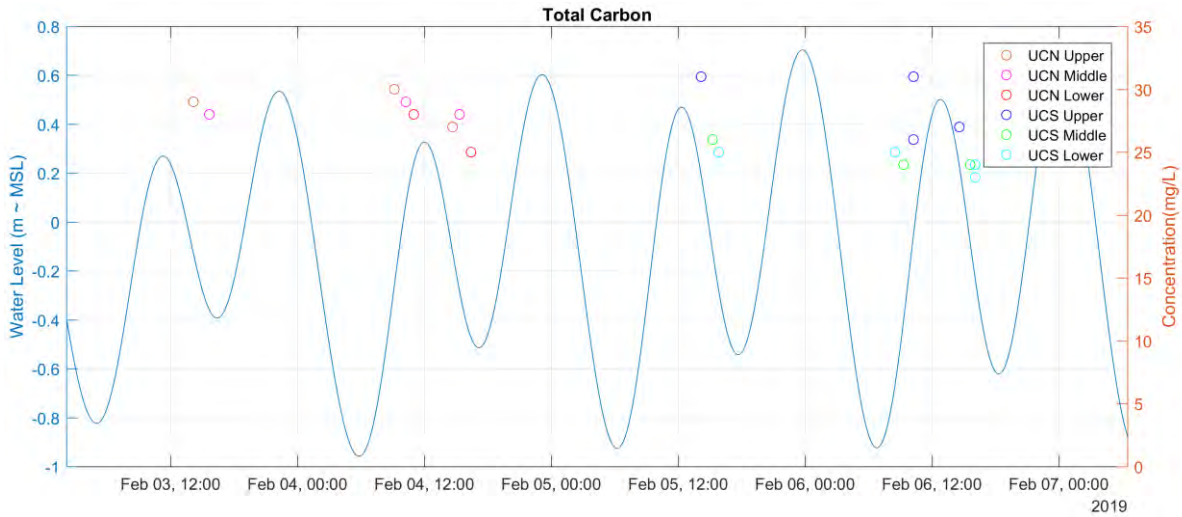


Figure 6-9 February 2019 total carbon

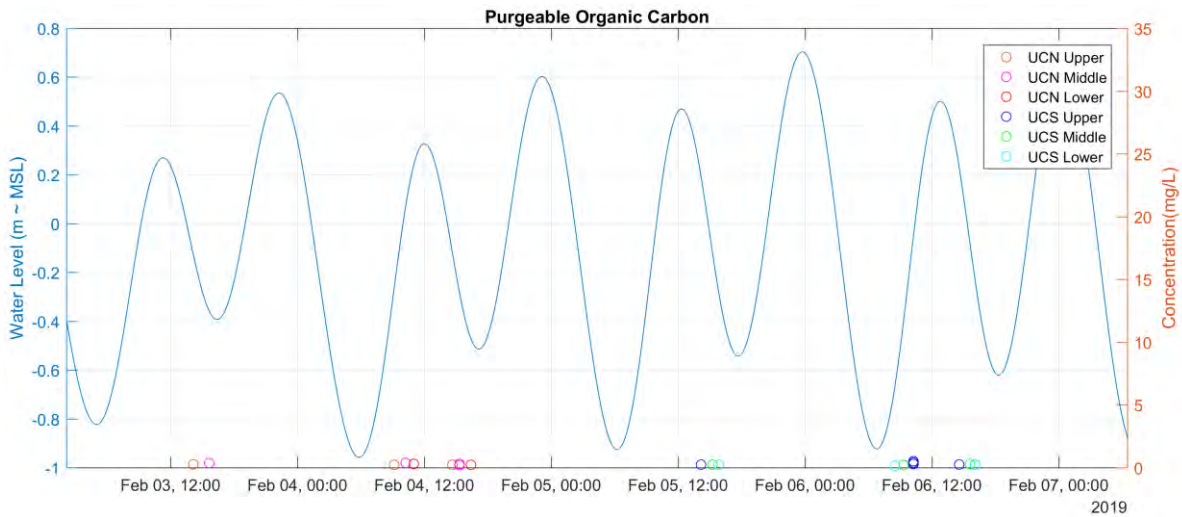


Figure 6-10 February 2019 purgeable organic carbon

The October 2019 monitoring results for total nitrogen, particulate nitrogen and dissolved inorganic nitrogen are displayed in Figure 6-11 to Figure 6-13.

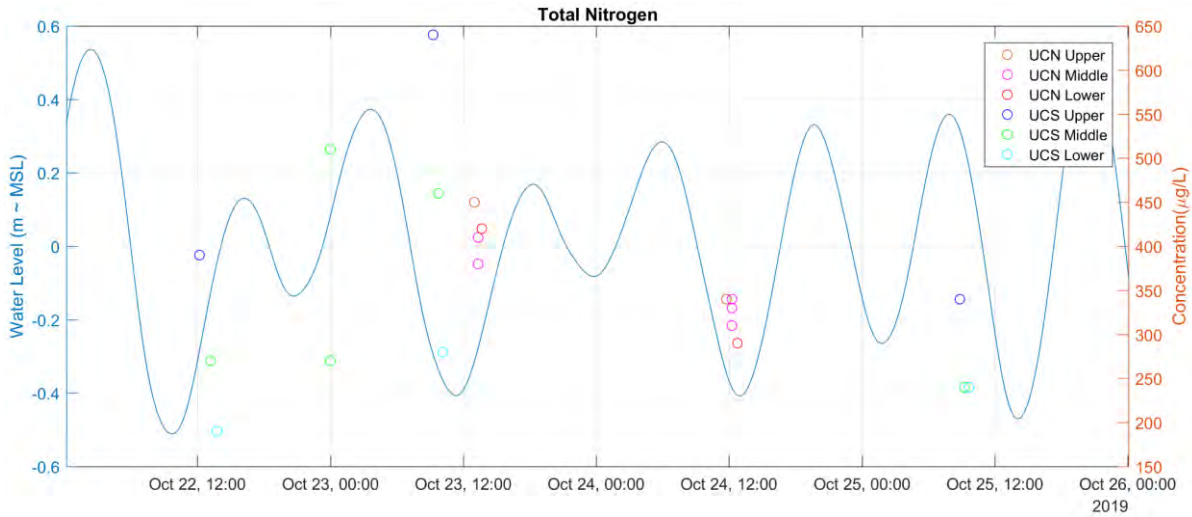


Figure 6-11 October 2019 total nitrogen

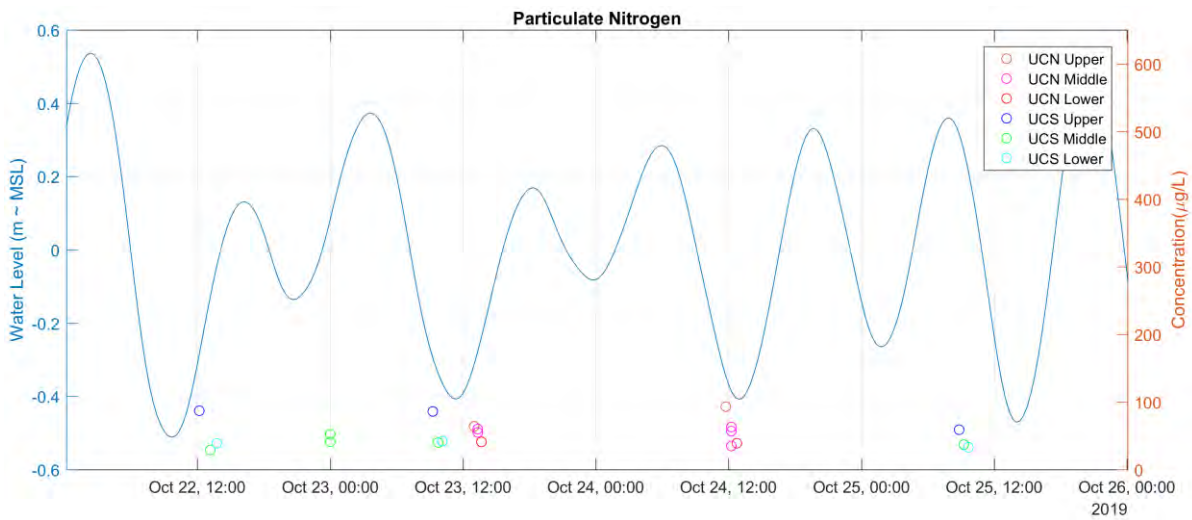


Figure 6-12 October 2019 particulate nitrogen

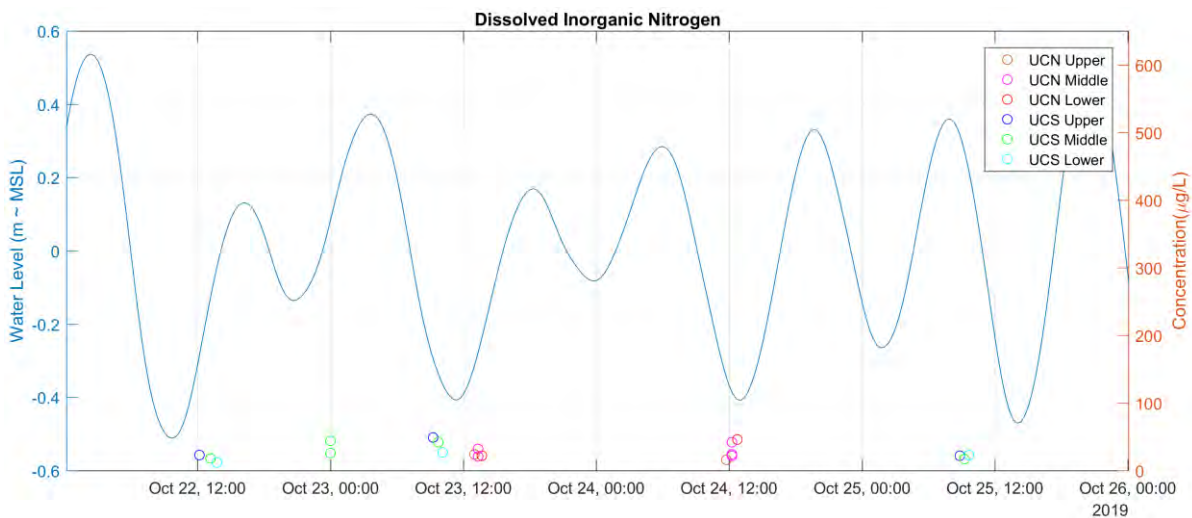


Figure 6-13 October 2019 dissolved inorganic nitrogen

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The October 2019 monitoring results for total phosphorus and particulate phosphorus are displayed in Figure 6-14 to Figure 6-15

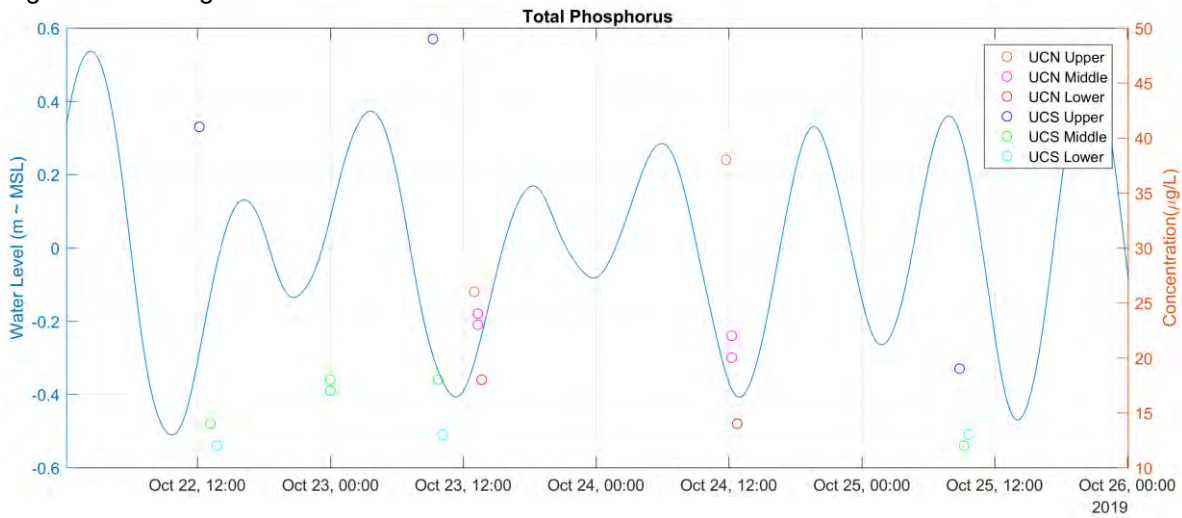


Figure 6-14 October 2019 total phosphorus

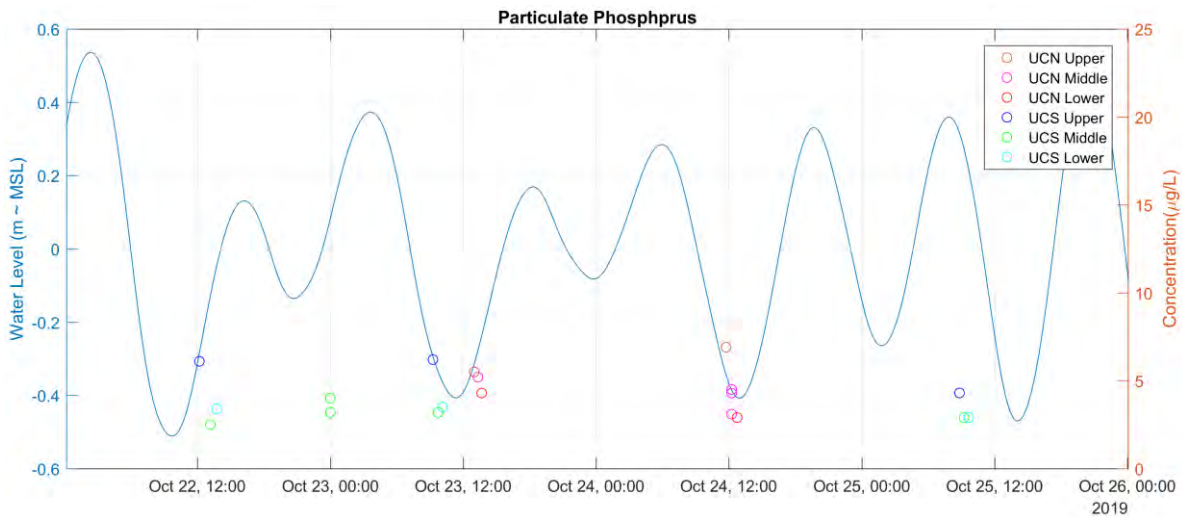


Figure 6-15 October 2019 particulate phosphorus

The October 2019 monitoring results for total carbon and total purgeable carbon are displayed in Figure 6-16 to Figure 6-17.

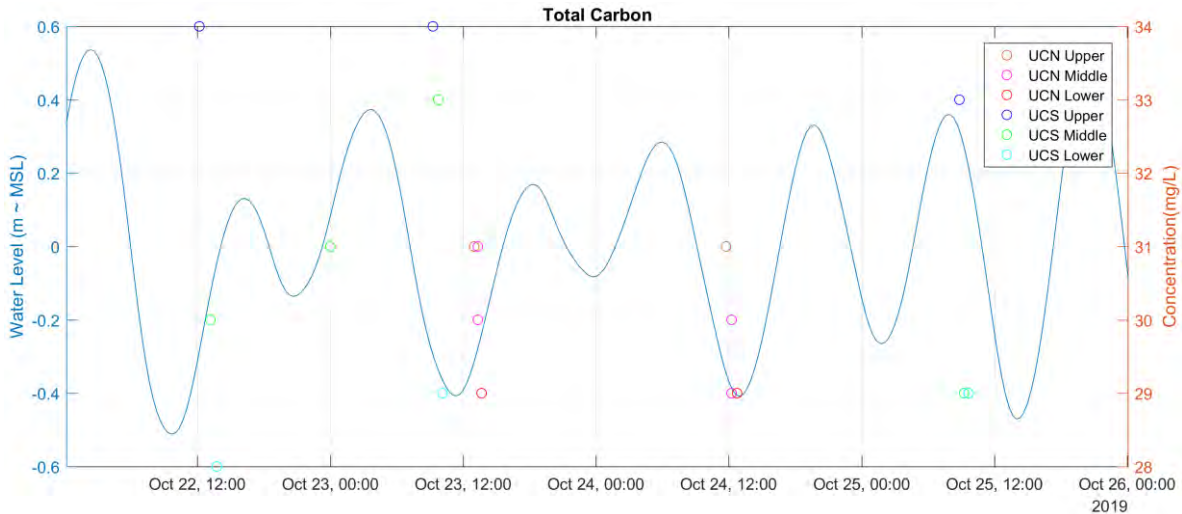


Figure 6-16 October 2019 total carbon

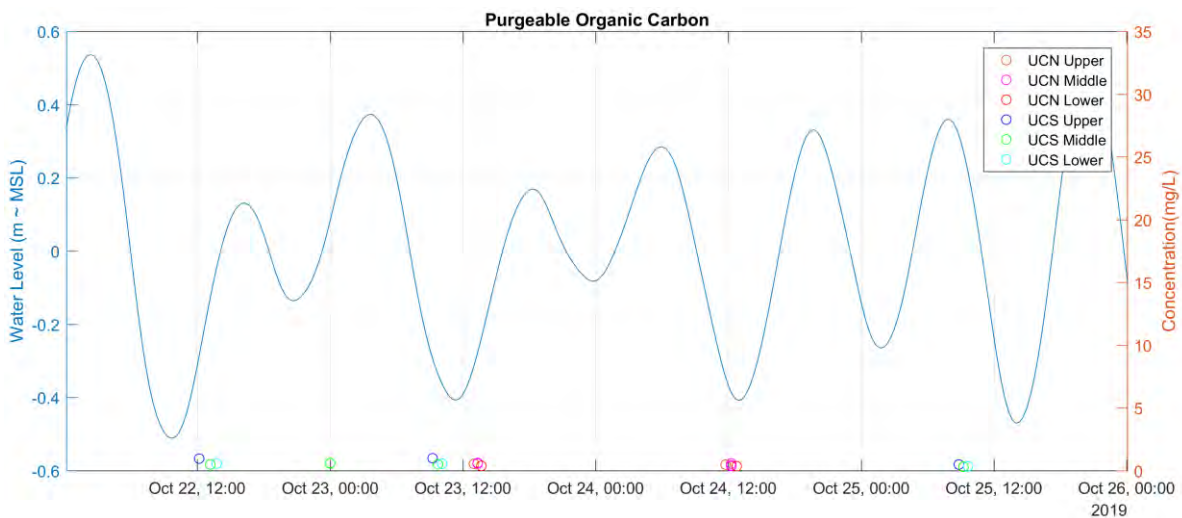


Figure 6-17 October 2019 purgeable organic carbon

The following can be concluded from the timeseries of the nutrient survey results:

- Particulate nitrogen and dissolved inorganic nitrogen made up only a small portion of total nitrogen. This means that the majority of nitrogen is dissolved organic nitrogen.
- Total nitrogen concentrations ranged from 140 µg/L at UCN Middle to 640 ug/L at Urala Creek South Upper
- Total nitrogen concentrations were higher during the neap tide in October, this could be due to less dilution due to decreased tidal flows.
- The average TN:TP ratio was 14:1 which indicates the creeks are nitrogen limited.
- In general due to the lower sampling frequency per site (i.e. 2-3 samples per day) it is difficult to determine the response to tidal inundation, however this is addressed in the sub-creek survey detailed further in Section 6.3 below.
- The data is of suitable quality for nutrient model calibration.

As sampling was conducted at a range of tidal stages, in order to establish the nitrogen gradient in Urala Creek North and South boxplots were generated with data from both surveys. The plots are presented below for



Urala Creek South and North in Figure 6-18 and Figure 6-19 respectively. The boxplot for Urala Creek South shows there is an observable gradient whereby nitrogen concentrations are greatest upstream, however this trend is not observed in Urala Creek North. Median concentrations were more consistent between upstream and downstream sites in Urala Creek North, indicating little to no gradient however values . Concentrations were slightly higher in the mid-estuary at Urala Creek North which is closest to the tributary that leads to algal mats, which receive more frequent inundation. This data and interpretation has been used in the nutrient model calibration within the report *Nutrient Pathways Assessment and Modelling* (Water Technology 2021).

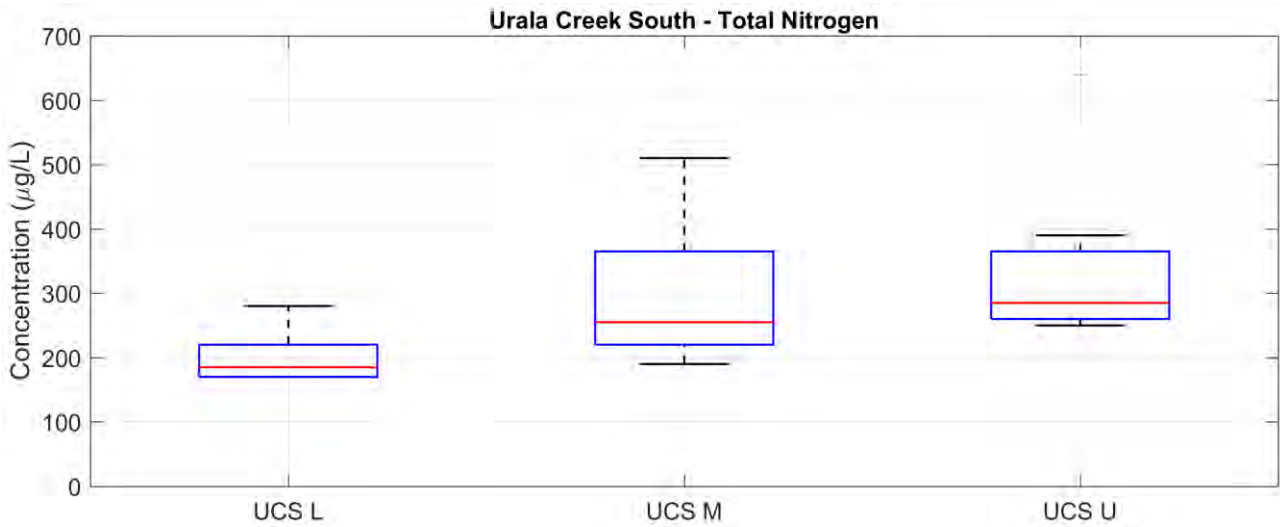


Figure 6-18 Nutrient survey total nitrogen boxplot – Urala Creek South

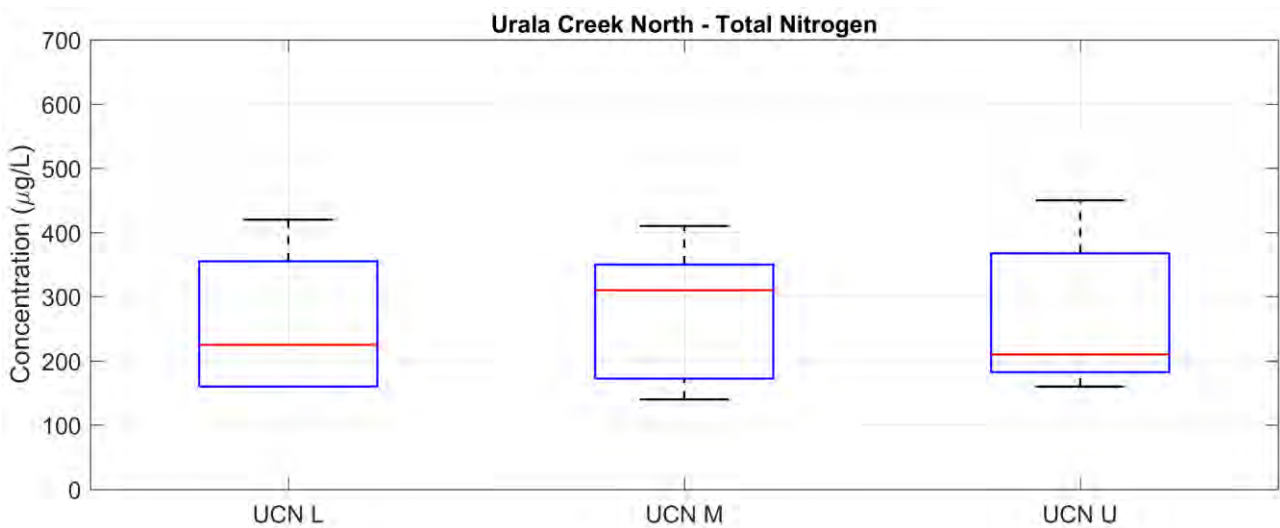


Figure 6-19 Nutrient Survey total nitrogen boxplot – Urala Creek North

Particulate samples were also collected at each site with a plankton net and were then filtered into three class sizes and nutrient contributions analysed. The results of the analysis are tabulated in Table 6.3. Samples between 50 – 1,000 µm are indicative of zooplankton. In general particulate samples were predominantly comprised of the zooplankton size class.



Table 6-3 February Particulate Sampling Results

Site	Date	Tide	Size (µm)	Dry weight (mg)	Total Phosphorus(mg)	Total nitrogen (mg)	Total Organic Carbon (mg)	Total Carbon (mg)
UCN-M1	3/02/2019	Ebb	<50	8.0	0.007	0.042	0.3	IS*
			50-<1000	3290	0.63	3.39	31.4	95.1
			>1000	1180	-	-	-	-
UCN-U2	4/02/2019	Flood	<50	1110	0.41	2.35	26.6	42.4
			50-<1000	4020	0.74	2.94	71.0	136.3
			>1000	9.6	-	-	-	-
UCN-M2	4/02/2019	Flood	<50	190	0.055	0.41	5.1	9.5
			50-<1000	2360	1.11	6.05	77.8	139
UCN-L2	4/02/2019	Flood	<50	396	0.20	1.19	13.5	20.2
			50-<1000	1390	0.23	0.75	11.7	44.8
UCN-U3	4/02/2019	Ebb	<50	153	0.081	0.57	5.3	7.4
			50-<1000	19.2	0.010	0.10	1.0	1.5
UCN-M3	4/02/2019	Ebb	50-<1000	134	0.036	0.30	2.9	3.1
UCN-L3	4/02/2019	Ebb	<50	131	0.069	0.40	4.4	6.4
			50-<1000	50.3	0.038	0.56	3.6	4.8
			>1000	0.9	-	-	-	-
UCS-U1	5/02/2019	Ebb	<50	34.9	0.016	0.14	1.5	2.0
			50-<1000	28.3	0.014	0.12	1.7	2.6
			>1000	0.7				
UCS-M1	5/02/2019	Ebb	<50	117	0.054	0.47	4.9	6.1

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Site	Date	Tide	Size (µm)	Dry weight (mg)	Total Phosphorus(mg)	Total nitrogen (mg)	Total Organic Carbon (mg)	Total Carbon (mg)
			50-<1000	141	0.069	0.54	6.5	8.3
			>1000	3.2	-	-	-	-
UCS-L1	5/02/2019	Ebb	<50	295	0.17	1.50	14.0	18.9
			50-<1000	294	0.15	1.41	17.8	24.2
			>1000	3.3	-	-	-	-
UCS-M2	6/02/2019	Flood	<50	532	0.33	1.93	16.7	25.1
			50-<1000	779	0.16	0.95	13.6	26.0
			>1000	0.3	-	-	-	-
UCS-U2	6/02/2019	Flood	<50	213	0.070	0.48	5.4	7.5
			50-<1000	434	0.14	0.95	12.6	18.9
			>1000	0.5				
UCS-U3	6/02/2019	Ebb	<50	72.5	0.030	0.31	3.5	3.9
			50-<1000	208	0.11	0.89	9.9	13.1
			>1000	3.0	-	-	-	-
UCS-M3	6/02/2019	Ebb	<50	105	0.043	0.34	3.8	5.2
			50-<1000	31.2	0.007	0.092	1.9	IS
UCS-L3	6/02/2019	Ebb	<50	74.2	0.039	0.57	5.5	6.3
			50-<1000	235	0.13	1.59	15.1	19.4
			>1000	7.2	-	-	-	-
UCN-U1	3/02/2019	Ebb	<50	183	0.078	0.49	5.4	10.4
			50-<1000	5980	0.86	1.40	21.2	172

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Site	Date	Tide	Size (µm)	Dry weight (mg)	Total Phosphorus(mg)	Total nitrogen (mg)	Total Organic Carbon (mg)	Total Carbon (mg)
			>1000	6.4	-	-	-	-

* IS = Insufficient sample

Table 6-4 October Particulate Sampling Results

Site	Date	Tide	Size (µm)	Dry weight (mg)	Total Phosphorus(mg)	Total nitrogen (mg)	Total Organic Carbon (mg)	Total Carbon (mg)
UCS-U-2	23/20/2019	Ebb	<50	57.6	0.014	0.152	1.7	2.5
			50-<1000	188	0.054	0.415	5.2	7.7
			>1000	28.0	-	-	-	-
UCS-M-1	22/10/2019	Flood	<50	12.3	0.011	0.093	0.7	IS
			50-<1000	69.3	0.057	0.591	5.1	6.2
			>1000	14.0	-	-	-	-
UCS-M-2	23/10/2019	Ebb	<50	12.6	0.007	0.056	0.6	IS*
			50-<1000	52.2	0.028	0.289	2.6	3.1
			>1000	9.2	-	-	-	-
UCN-U-2	24/10/2019	Ebb	<50	32.2	0.011	0.082	0.8	1.4
			50-<1000	168	0.045	0.328	4.3	6.7
			>1000	26.3	-	-	-	-
UCN-U-1	23/10/2019	Flood	<50	7.1	0.005	0.039	0.4	IS
			50-<1000	34.1	0.017	0.139	1.5	no result
			>1000	4.4	-	-	-	-
UCN-M-1	23/10/2019	Flood	<50	8.5	0.007	0.038	0.5	IS

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Site	Date	Tide	Size (µm)	Dry weight (mg)	Total Phosphorus(mg)	Total nitrogen (mg)	Total Organic Carbon (mg)	Total Carbon (mg)
			50-<1000	37.1	0.018	0.200	1.8	2.8
			>1000	3.2	-	-	-	-
UCS-L-1	22/10/2019	Flood	<50	83.0	0.047	0.340	3.1	5.7
			50-<1000	345	0.211	1.578	16.4	24.7
			>1000	28.1	-	-	-	-
UCS-U-1	22/10/2019	Flood	<50	51.9	0.016	0.156	1.4	2.2
			50-<1000	164	0.050	0.413	5.5	7.7
			>1000	28.7	-	-	-	-
UCS-M-3	25/10/2019	Ebb	<50	10.7	0.006	0.039	0.5	IS
			50-<1000	19.8	0.012	0.137	1.0	1.7
			>1000	2.9	-	-	-	-
UCS-U-3	25/10/2019	Ebb	<50	9.5	0.006	0.027	0.3	IS
			50-<1000	44.2	0.010	0.114	1.2	no result
			>1000	7.9	-	-	-	-
UCS-L-2	23/10/2019	Ebb	<50	11.4	0.009	0.048	0.5	IS
			50-<1000	84.8	0.049	0.463	4.7	5.3
			>1000	17.8	-	-	-	-
UCN-L-1	23/10/2019	Flood	<50	39.6	0.020	0.146	1.5	2.1
			50-<1000	180	0.073	0.552	8.1	12.7
			>1000	33.6	-	-	-	-
UCN-M-2	24/10/2019	Ebb	<50	6.8	0.005	0.019	0.2	IS

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Site	Date	Tide	Size (µm)	Dry weight (mg)	Total Phosphorus(mg)	Total nitrogen (mg)	Total Organic Carbon (mg)	Total Carbon (mg)
			50-<1000	52.8	0.027	0.234	1.0	6.0
			>1000	8.3	-	-	-	-
UCS-L-3	25/10/2019	Ebb	<50	5.6	0.004	0.022	0.2	IS
			50-<1000	20.4	0.013	0.122	1.2	1.5
			>1000	4.3	-	-	-	-
UCN-L-2	24/10/2019	Slack water	<50	7.9	0.007	0.035	0.4	IS
			50-<1000	29.9	0.015	0.130	1.4	2.1

* IS = Insufficient sample



6.3 Sub-creek Survey

6.3.1 Methodology

The purpose of the sub-creek survey was to quantify varying nutrient concentrations in two small sub-creeks, the locations of which are shown in Figure 6-1. This data provides additional understanding of the contribution of algal mats to nutrient and carbon levels in adjacent waterways. To provide context to the term sub-creek, photos of two such sub-creeks from within the project site are shown in Figure 6-20.



Figure 6-20 Subcreeks within the site



Filtering, sample volume and sample container requirements are provided in Table 6-5.

Table 6-5 Analytical parameters, sample volumes, container type, preservation and holding times for nutrients in water samples

Parameter	LOR (mg/L)	Sample volume and Bottle	Treatment / Preservation	Holding time
Total N	0.05	2 x 125 mL HDPE bottle	Unfiltered / Freeze	30 days
Total P	0.005			
Ammonia	0.003	2 x 10mL Polypropylene tube	Filtered* / Freeze	
Nitrate+Nitrite	0.002			
Phosphate	0.002			
Total Organic Carbon (TOC)	0.6	1 x 125mL HDPE bottle	Unfiltered / Freeze	
Total Carbon (TC)	0.6			
Total Dissolved N	0.05	2 x 125 mL HDPE bottle	Filtered* / Freeze	
Total Dissolved P	0.005			
Dissolved Organic Carbon (TOC)	0.6	1 x 125mL HDPE bottle	Filtered* / Freeze	
Particulate Organic Carbon	0.6	1 x GF/C filter paper	Fold filter paper in quarters, wrap in unused filter paper and put in provided envelope. / Freeze.	
Total Suspended Solids (TSS)	-			
Particulate N	0.05	1 x GF/C filter paper		
Particulate P	0.005			

* Filtered with a syringe filter

6.3.2 Timing

The survey was undertaken over three days from the 30th August 2019 to 1st September 2019. The survey period, in relation to measured water levels at Urala Creek South are shown in Figure 6-21. The monitoring consisted of hourly sampling at one location per day to cover both an ebb and flood tide. This gave an accurate measurement of nutrient concentrations across the tidal cycle.

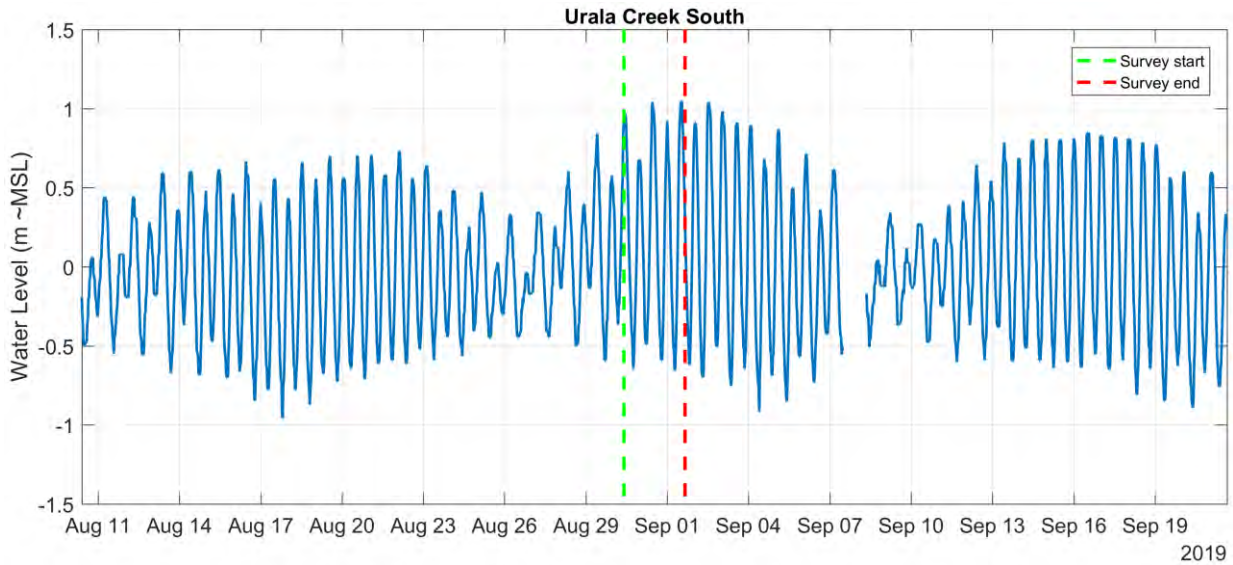


Figure 6-21 Water levels during the August 2019 sub-creek survey

6.3.3 Results

The nitrogen results for the sub-creek survey, along with water levels measured at Urala Creek South are shown in Figure 6-22. There could be a slight phase difference between water levels at the measurement location and sampling location, however they are not expected to be greater than 1 hour.

The results show that in general nitrogen concentrations are lowest at highwater, which could be related to the dilution of nitrogen rich water in the sub-creeks by less nutrient rich oceanic water brought in with incoming tide. Concentrations then increase after highwater on the ebb tide. In a study by Adame et al. (2012), similar trends were observed in creeks adjacent to algal mats within Exmouth Gulf. Adame et al. (2012) concluded that these reductions on the flood tide were due to nutrient removal from flooded algal mats, however the sampling was undertaken during a period of significant rainfall, whereas the sampling herein was during dry conditions and the research concluded the wet weather may have influenced the results. The trend is most noticeable for nitrogen.

With regard to speciation, nitrogen concentrations are largely comprised of dissolved organic nitrogen. Although the plots only shows organic nitrogen, it can be inferred that this is predominately dissolved due to the low levels of particulate nitrogen.

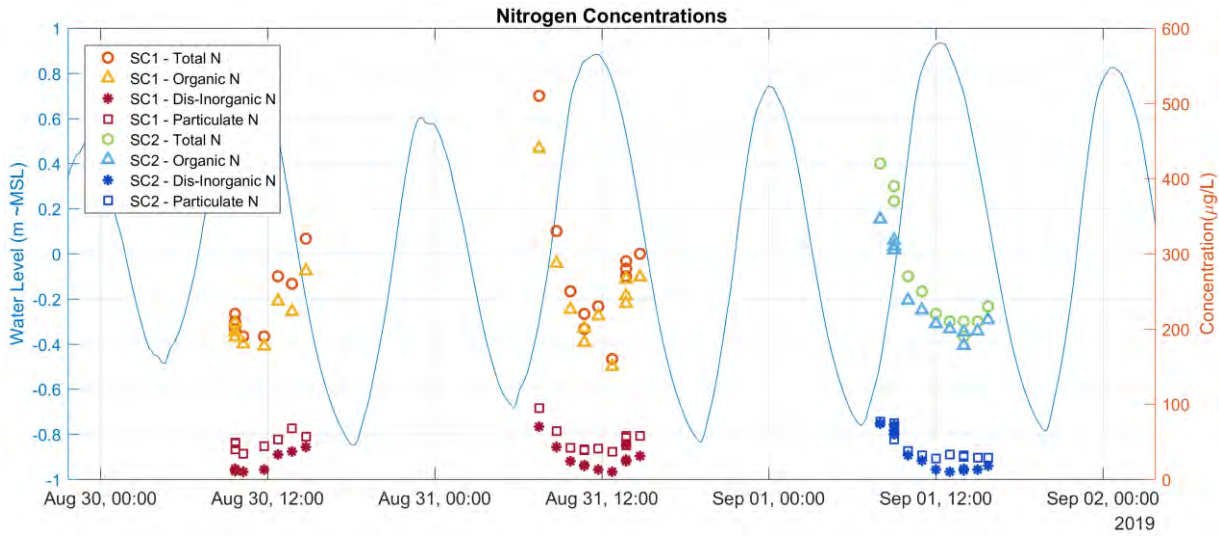


Figure 6-22 Sub-creek survey nitrogen results

The monitoring results for phosphorus are displayed Figure 6-23. Orthophosphate, which is an inorganic form of phosphorus, on average represented 15% of total phosphorus concentrations which is only a small portion of total phosphorus concentrations. Particulate phosphorus was also low which means that the majority of phosphorus in the water column is dissolved organic phosphorus and is likely from a biological source such as plants, microbes, detritus and organic matter.

The results also show the influence tidal waters have on phosphorus concentrations, as they decrease on the flood tide and increase on the ebb. This trend was also observed in carbon.

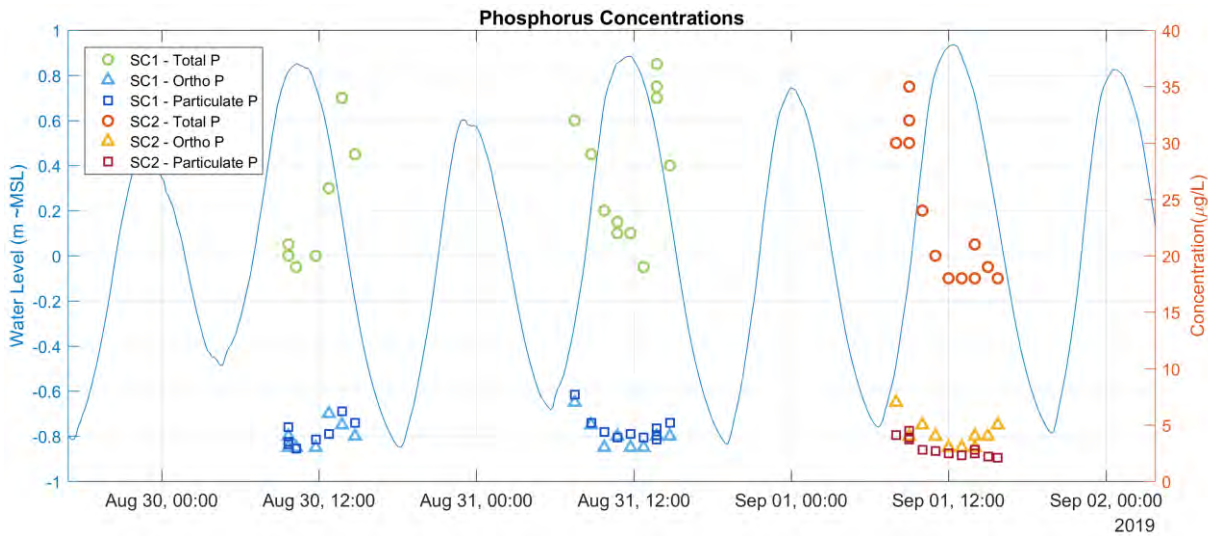


Figure 6-23 Sub-creek survey phosphorus results

The total carbon monitoring results are presented in Figure 6-24. The tidal induced dilution trend is less pronounced in the carbon results, however it is still noticeable.

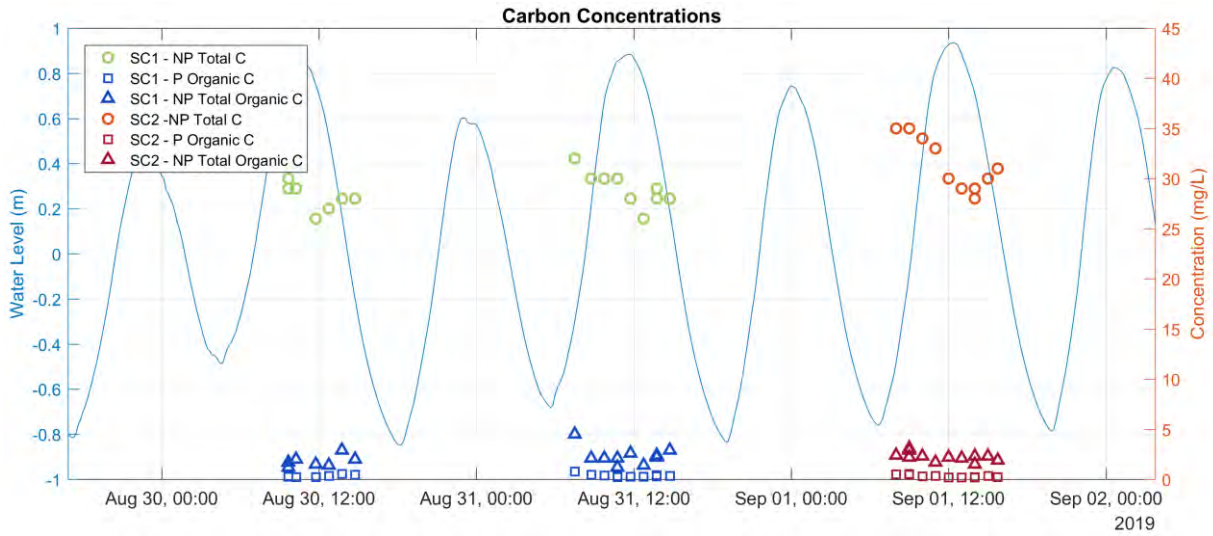


Figure 6-24 Sub-creek survey carbon concentrations (NP = non-purgeable, p= purgeable)

Particulate samples were also collected at each site with a plankton net and were then filtered into three class sizes and nutrient contributions will be analyzed. The results of the analysis are tabulated in Table 6-6. Samples between 50 – 1,000 μm are indicative of zooplankton. In general particulate samples were predominantly in the zooplankton size class.



Table 6-6 Sub-creek Particulate Sampling Results

Site	Date	Tide	Size (µm)	Dry weight (mg)	Total Phosphorus(mg)	Total nitrogen (mg)	Total Organic Carbon (mg)	Total Carbon (mg)
SC1	30/08/2019	Ebb	<50	14.1	0.008	0.059	0.5	insufficient sample
			50-<1000	11.1	0.006	0.041	0.4	insufficient sample
			>1000	1.2	-	-	-	-
SC1	30/08/2019	Ebb	<50	9.6	0.004	0.028	0.2	insufficient sample
			50-<1000	92.1	0.032	0.344	2.8	3.5
			>1000	14.6	-	-	-	-
SC2	1/09/2019	Ebb	<50	22.6	0.012	0.098	0.9	1.5
			50-<1000	68.8	0.033	0.346	3.0	4.2
			>1000	13.9	-	-	-	-
SC1	30/08/2019	Flood	<50	15.1	0.011	0.061	0.6	insufficient sample
			50-<1000	72.2	0.031	0.273	2.9	3.3
			>1000	20.3	-	-	-	-
SC2	1/09/2019	Flood	<50	103	0.027	0.304	3.1	3.8
			50-<1000	330	0.071	0.505	8.8	12.4
			>1000	43.4	-	-	-	-
SC1	30/08/2019	Flood	<50	48.3	0.015	0.135	1.2	1.9
			50-<1000	157	0.042	0.330	4.1	5.4
			>1000	30.2	-	-	-	-

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6.4 Intertidal survey

6.4.1 Methodology

A three-day intertidal survey was undertaken in May 2019, where AECOM collected cores from algal mats and salts flats, the locations of sampling locations are displayed in Figure 6-26. Two core samples were collected at each site, one for determining cyanobacterial species composition and one for laboratory analysis. The samples (diameter 25 mm; depth 30 mm) were collected by pushing a mini-corer into the sediment. At sites where algal mats are present, the mini-core samples typically include both the surface veneer of algal mat and the underlying sediment to which the algal mat adheres. A typical core sample is displayed in Figure 6-25.



Figure 6-25 Typical core sampled from an algal mat area showing a thin veneer (~5 mm thick) of algal mat and under-lying sediment

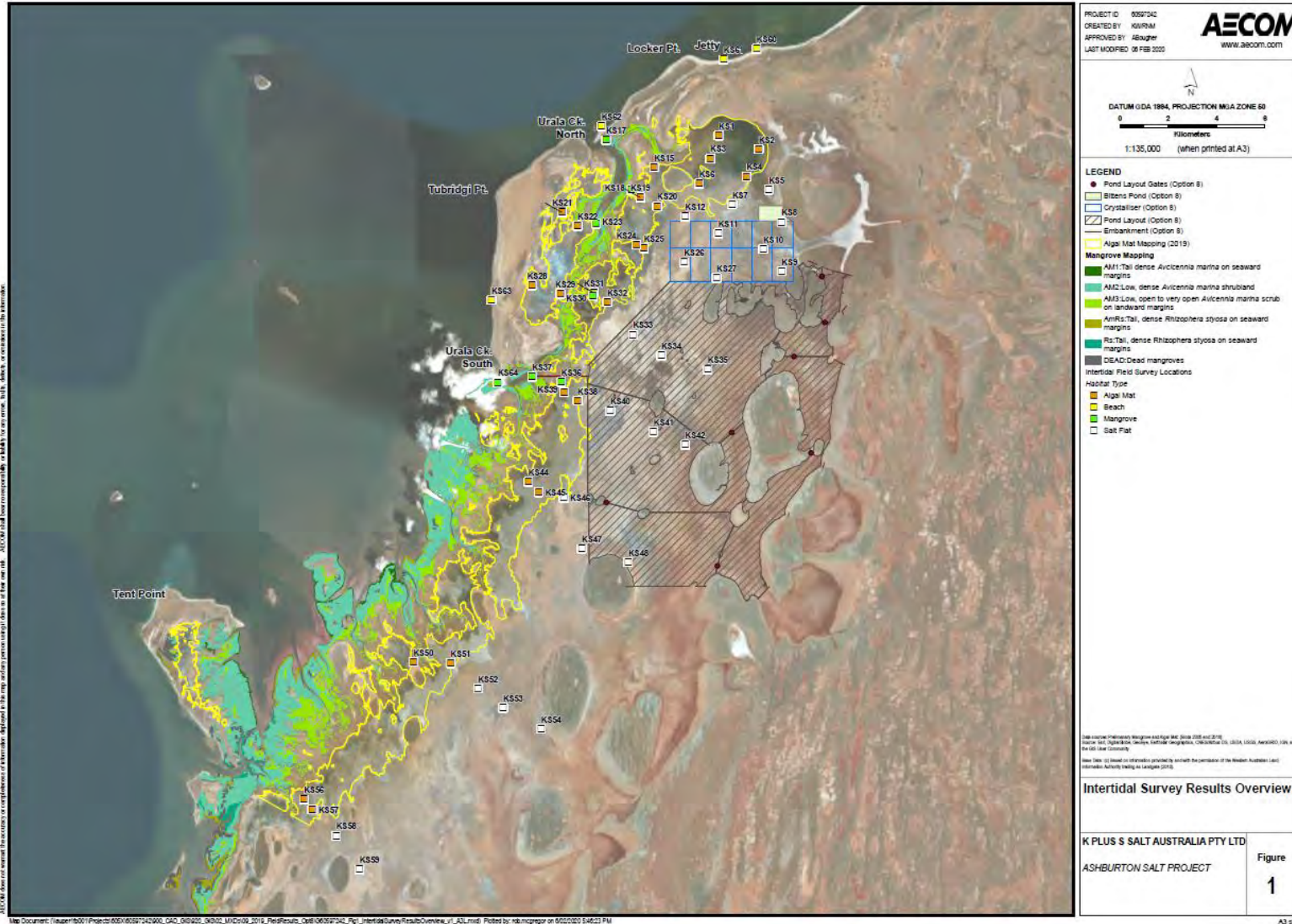


Figure 6-26 Intertidal sediment survey locations



6.4.2 Results

Water Technology were provided with the results from the laboratory analysis. Figure 6-27 displays correlation between moisture content and chlorophyll-a. This figure shows that chlorophyll concentrations increase with moisture content from which it is inferred that biological activity increases with water exposure.

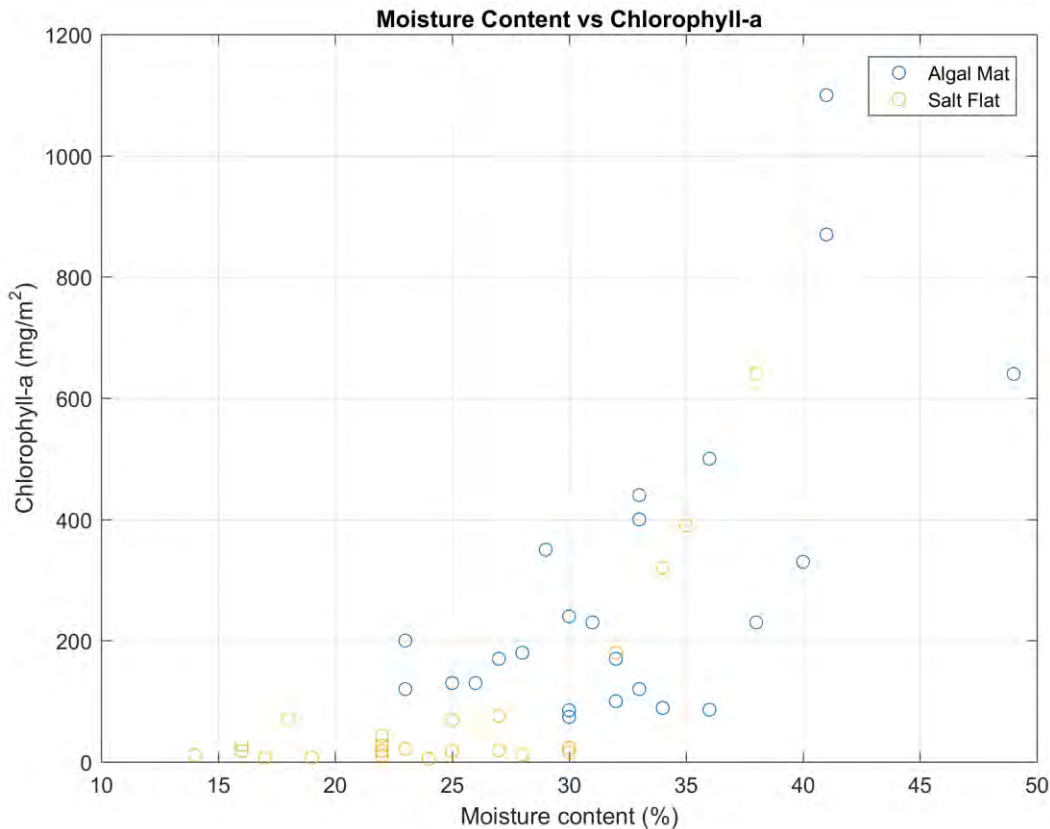


Figure 6-27 Moisture content vs chlorophyll-a

Chlorophyll-a and phaeophytin are considered indicator pigments for photosynthetic activity. The results below show very low chlorophyll-a and phaeophytin levels in the salt flats compared to the algal mats. The average chlorophyll-a level for the combined algal mat and peripheral algal mat areas is 275 mg/m². These results support the assumption that the salt flats do not support significant cyanobacterial growth and therefore do not generate significant amounts of nutrients themselves.

Whilst some minor amounts of chlorophyll-a and phaeophytin were detected in the salt flat samples these were very low compared to the algal mat samples (salt flat levels were approximately 7 – 15% of levels detected in the core algal mat areas). The minor amounts of chlorophyll-a and phaeophytin detected in the salt flat samples could be due to small amounts of microalgae present in the salt flat. These low levels of chlorophyll-a and phaeophytin in the salt flat samples indicate that the salt flat is highly unlikely to be significant generator of nutrients compared with the algal mat areas.

Table 6-7 summarises the AECOM sampling results.



Table 6-7 SUMMARY OF AECOM SAMPLING RESULTS FOR ALGAL MATS AND SALT FLATS

Sample	Chlorophyll-a (mg/m ²)	Phaeophytin	Microscopic analysis
Algal mat - core	414 ± 77	166 ± 29	Distinct dark green mat structure present. Main algae species were <i>Microcoleus</i> sp. and <i>Lyngbya</i> sp. and <i>Oscillatoria</i> sp. as noted from other Pilbara algal mat areas. Also present were some additional blue green algal species including <i>Schizothrix</i> sp. <i>Calothrix</i> and <i>Cyanothece</i> sp, and the diatom, <i>Navicula</i> sp.
Algal mat - peripheral	137 ± 22	133 ± 27	The presence of a distinct mat became less apparent in peripheral areas and the diversity of algae species was reduced with <i>Oscillatoria</i> sp. and <i>Lyngbya</i> sp. being dominant.
Salt flat	29 ± 5	25 ± 5	No algae/cyanobacteria observed. The minor amounts of chlorophyll-a and phaeophytin detected in the salt flat samples could be due to small amounts of microalgae present in the salt flat. These low levels of chlorophyll-a and phaeophytin in the salt flat samples indicate that the salt flat is highly unlikely to be significant generator of nutrients compared with the algal mat areas.

7 APRIL 2019 - BIOTA – SURFACE WATER QUALITY MONITORING

7.1 Summary

In April 2019 Biota were on site during a rainfall event. Water Technology and EnviroWorks advised Biota to conduct opportunistic water quality monitoring on the 14th April 2019. Ten samples were collected by Biota (Figure 7-2). Of these 10 sampling locations, only three are representative of the bare salt flats (ASHW02, ASHW07 and ASHW09). All the other locations are within the hinterland, claypans, islands or very close to algal mat area. The rainfall created ponding of water within the salt flats, creek lines and claypans.

A timeseries of Climate Forecast System (CFS) rainfall estimated to have occurred at the site for this rainfall event (peak rainfall approximately 23 mm) and total rainfall 44 mm over 2 days is displayed in Figure 7-1 and sample collections locations are displayed in Figure 7-2.

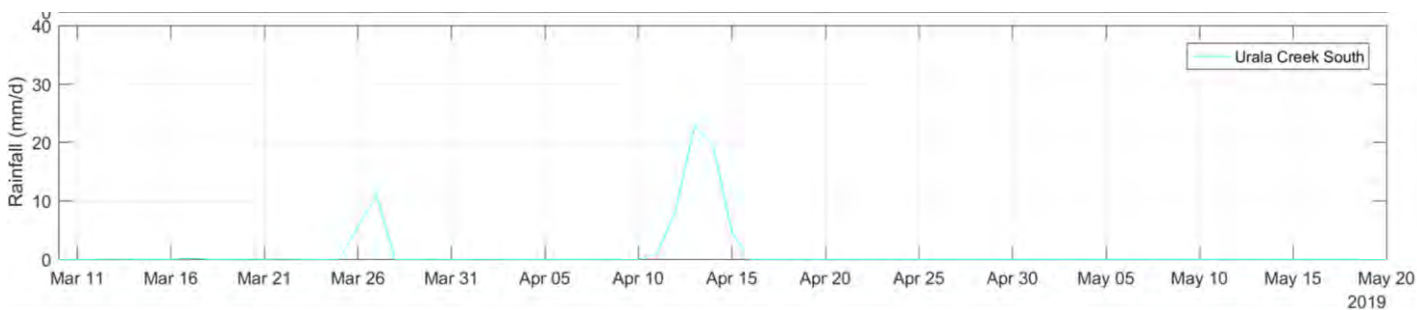


Figure 7-1 CFS Rainfall at node closest to Urala Creek South

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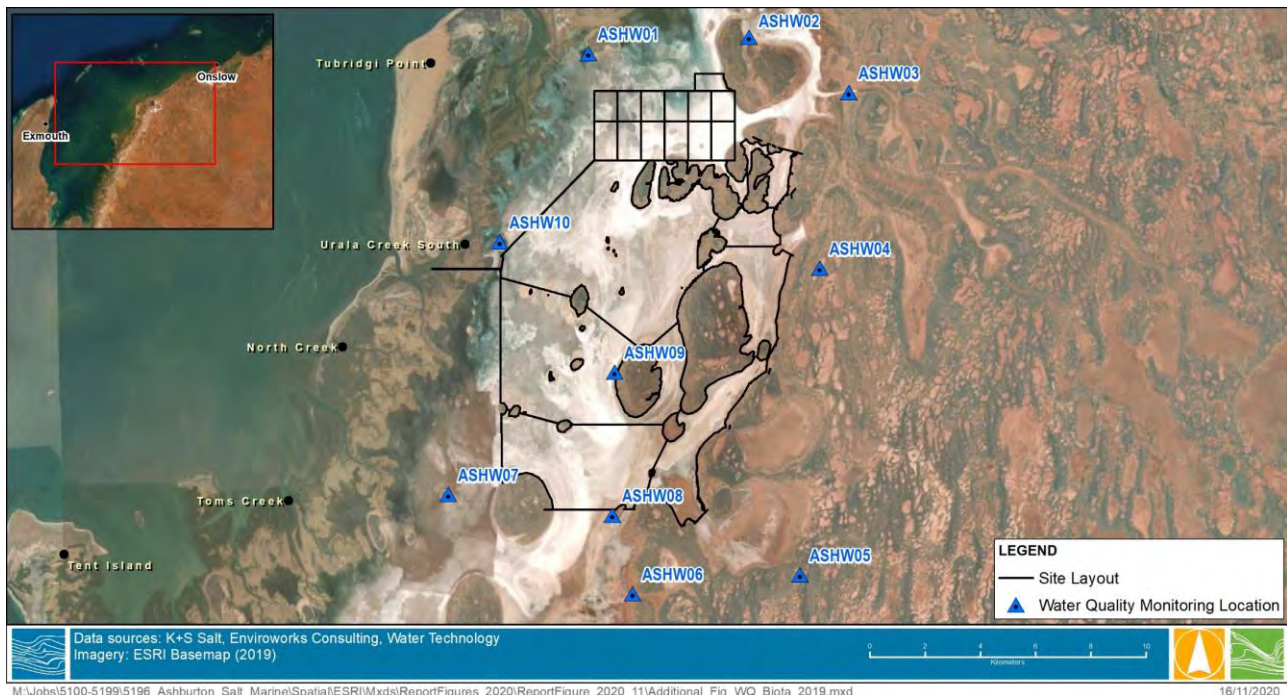


Figure 7-2 Biota water quality monitoring locations

7.2 Results

The results of the surface water monitoring are quantified in Table 7-1. The following can be concluded from the laboratory results:

- All samples were comprised of predominantly dissolved nitrogen except ASHW01 and ASHW08, which had lower dissolved levels.
- ASHW08 was quite a muddy sample, so the extremely high nitrogen concentration, which is almost all particulate, is also indicative of the high nitrogen content in the sediments from overland flows.
- Across most sites nitrogen was largely organic, with very little ammonia. This is except for ASHW05, the most inland site, which had a higher proportion of nitrate, compared to organic content.
- The mean total nitrogen concentration across nine sites (excluding ASHW08) was 1.1 mg/L. ASHW08 was excluded as it was more a sediment slurry, as opposed to a representative surface water sample.
- Phosphorus was highest at the most inland sites and largely particulate at these locations. The sites with the high phosphorus also corresponded to sites with the highest TSS. This is the result of phosphorus adsorption to sediment. This observation adds further confidence to the assertion that the environment is nitrogen limited, as there is phosphorus readily available in soils across the site.
- Conductivity and TDS measurements indicate that surface water is brackish at sites closest to the coastline and within overland tidal flow paths and saline to hypersaline on the salt flats.
- pH across the salt flats and inland flow paths ranged from neutral to slightly alkaline (pH range 7.3 – 8.6).
- Total Suspended Solids (TSS) varied significantly with lower levels on the salt flats (<5 – 37 mg/L) and higher levels inland of the salt flats (54 – 19,000 mg/L). Levels within an inland flow path were extremely high (resembling a slurry) at 510,000 mg/L.
- Levels of chlorophyll-a were low in all samples (<0.001 to 0.006 mg/L) except that from the overland flow sample which resembled a slurry (0.32 mg/L).



- The results show that the nitrogen in the water ponding on the bare salt flats is low compared with the other samples, particularly those received as suspended solids in overland flows (such as the highly turbid water from overland flows entering the salt flats at sampling point ASHW08). The data shows that the bare salt flats do not generate comparatively large amounts of nitrogen in ponded water, even after inundation with rainfall, compared with turbid overland flows/ponding from the hinterland.
- High levels of total dissolved solids in the samples from the bare salt flats indicate that the surface salt crust was dissolving into the ponded water on the bare salt flats, but there are comparatively low levels of nitrogen in this dissolved salt crust compared with overland flows.



Table 7-1 Biota event water quality monitoring

Analyte	Units	ASHW01	ASHW02	ASHW03	ASHW04	ASHW05	ASHW06	ASHW07	ASHW08	ASHW09	ASHW10
Habitat Type	N/A	Salt Flat – near algal mat	Island Edge	Inland Ponding – Creekline no flow	Inland Ponding - Clay Pan	Inland Ponding - Clay Pan	Inland Ponding – Creekline no flow	Bare Salt Flat	Overland flow - creek	Bare Salt Flat	Salt Flat – near algal mat
Total Nitrogen	mg/L	1.1	0.6	0.8	3.3	1	0.6	0.8	120	0.7	1
Total Nitrogen (Filtered)	mg/L	<0.2	0.5	0.8	1.7	1	0.4	0.5	<0.2	0.4	0.8
Total Kjeldahl Nitrogen	mg/L	1.1	0.5	0.7	2.5	0.2	0.4	0.8	120	0.7	1
Total Phosphorus	mg/L	<0.01	0.02	0.13	19	25	8.9	0.08	22	0.11	0.02
Filtered Total Phosphorus	mg/L	<0.01	0.02	0.01	0.15	0.95	0.06	0.01	0.08	<0.01	0.01
Filterable Reactive Phosphorus	mg/L	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	0.01	<0.01	<0.01
Ammonia-N	mg/L	<0.02	0.11	0.09	<0.02	<0.02	<0.02	0.04	1.9	0.06	0.14
NOx-N	mg/L	0.02	0.06	0.09	0.76	0.77	0.23	0.02	0.09	0.01	0.01
Nitrite-N	mg/L	<0.01	<0.01	0.01	0.05	0.08	0.05	<0.01	0.05	<0.01	<0.01
Nitrate-N	mg/L	0.02	0.06	0.08	0.71	0.69	0.18	0.02	0.04	0.01	0.01
Chlorophyll-a	mg/L	<0.001	0.003	0.005	<0.001	<0.001	<0.001	0.001	0.32	0.006	<0.001
pH	pH	8.5	7.7	7.3	7.7	8.2	7.5	8	7.4	7.7	8.6
Conductivity	mS/cm	71	17	230	1.7	0.31	1.5	120	130	140	95
Dissolved Oxygen	mg/L	8.4	8.2	7.7	9.9	9.5	9.6	8.4	6.3	8.1	10
Total Dissolved Solids	mg/L	53,000	12,000	270,000	950	190	820	100,000	120,000	120,000	75,000
Total Suspended Solids	mg/L	<5	<5	54	19,000	170	2,200	28	510,000	37	6
Total Organic Carbon	mg/L	4	2	7	10	6	7	8	14	9	8

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8 OCTOBER 2019 – WATER TECHNOLOGY – COASTAL MONITORING

8.1 Summary

Water Technology undertook additional data collection using an M9 ADCP to measure current velocity and discharge in Urala Creek South over two consecutive days on the 31st October 2019 and 1 November 2019. Two transects were measured and are displayed in Figure 8-1.

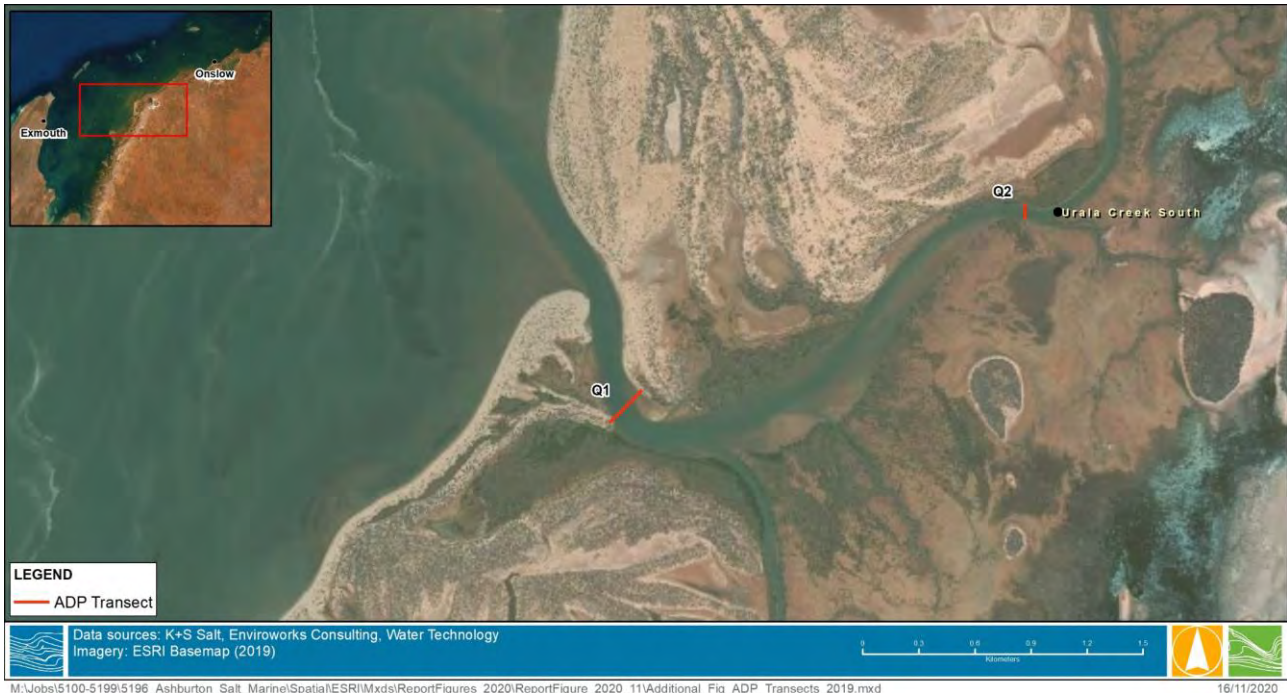


Figure 8-1 ADP Transects

8.2 Results

The measured tidal discharge data is summarised in Table 8-1. As the water level loggers were retrieved and deployed during this time there is no measured water level data available, however a prediction was generated utilising 12-months of collected data at Urala Creek South and is displayed with the measured tidal discharge data in Figure 8-2. As expected, the flows were greatest at the creek mouth and decreased upstream. It was also observed that peak flows occurred during the flood tide close to highwater, before rapidly reversing on the ebb tide.

Table 8-1 Discharge summary

Date	Transect	Discharge (m ³ /s)	Tide Phase
31/10/2019 10:51	Q2	35	Flood
31/10/2019 11:06	Q2	40	Flood
31/10/2019 11:13	Q2	41	Flood
31/10/2019 11:22	Q2	47	Flood
31/10/2019 11:37	Q2	46	Flood

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Date	Transect	Discharge (m ³ /s)	Tide Phase
31/10/2019 12:05	Q2	42	Flood
1/11/2019 13:00	Q1	84	Flood
1/11/2019 13:14	Q1	81	Flood
1/11/2019 14:34	Q1	-66	Ebb
1/11/2019 14:44	Q1	-71	Ebb
1/11/2019 14:51	Q1	-61	Ebb

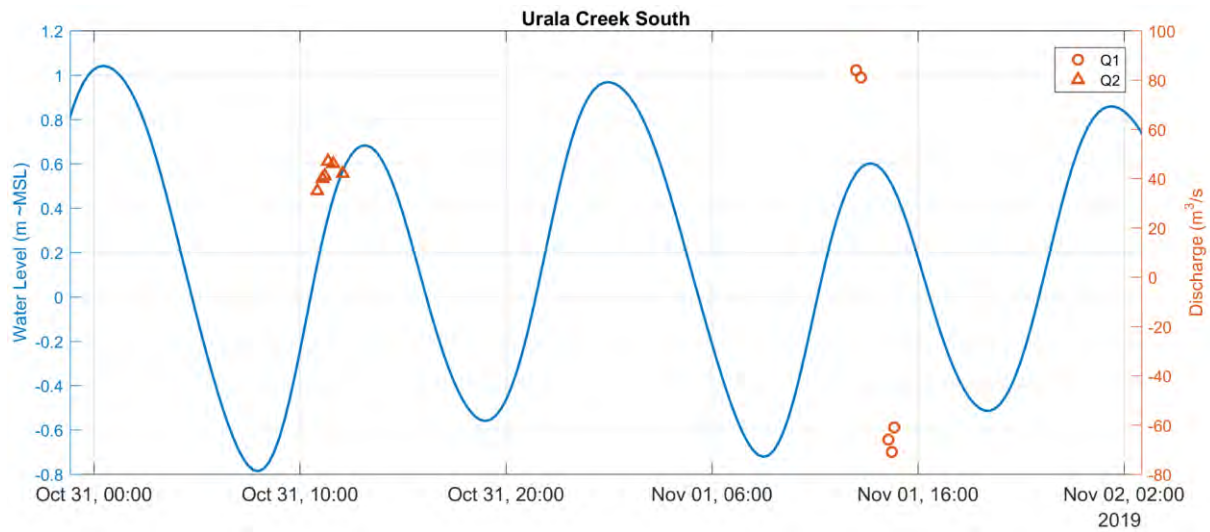


Figure 8-2 Predicted water levels and measured discharge in Urala Creek South



9 DECEMBER 2020 – APRIL 2021– TERRAFIRMA OFFSHORE – TARGETED MARINE WATER QUALITY MONITORING

9.1 Summary

From December 2020 until March 2021, Terrafirma Offshore undertook targeted marine water quality sampling at Locker Point, for laboratory analysis to determine if the ANZG (2018) EQC (99% species protection level) for copper of 0.0003 mg/L is regularly exceeded in natural seawater at the location.

The laboratory PQL was previously set at 0.001 mg/L and previous monitoring had showed this PQL had been exceeded on two occasions at the site (refer to Section 5.7.1). However ongoing monitoring with a revised PQL of 0.0003 mg/L was required in order to enable the setting of appropriate EQC for the bitterns discharge at the site in terms of species protection levels for copper.

Duplicate samples were taken for each sampling event and tested by NATA accredited laboratory ARL.

9.2 Results

The results of the monitoring are summarised in Table 9-1 below. These data show that the ANZG (2018) EQC (99% species protection level) of 0.0003 mg/L is regularly exceeded naturally in background seawater at Locker Point.

Table 9-1 Low concentration results at Locker Point

Sample Date	Copper Result (mg/L)
3/12/20	<0.0003
3/12/20	<0.0003
4/1/21	<0.0003
4/1/21	0.0003
7/2/21	0.0006
7/2/21	0.0009
6/3/21	0.0006
6/3/21	0.0007
5/4/21	0.0007
5/4/21	0.0008



10 MARCH 2021– TERRAFIRMA OFFSHORE – SURFACE WATER QUALITY MONITORING

10.1 Summary

Throughout the end of February 2021 and first week of March 2021 troughs and low-pressure systems generated heavy rainfall across much of northern of Australia. The K+S on-site weather station recorded heavy rainfall over three days from 1st to 3rd of March 2021 as summarised in Table 10-1 and Figure 10-1 below. This was the largest rainfall event recorded on the site in over four years with 79.5 mm of rainfall recorded over three days.

Table 10-1 1st to 3rd March 2021 rainfall event summary

Date	Rainfall (mm)
1 st March 2021	13.34
2 nd March 2021	52.83
3 rd March 2021	13.34
Total	79.51

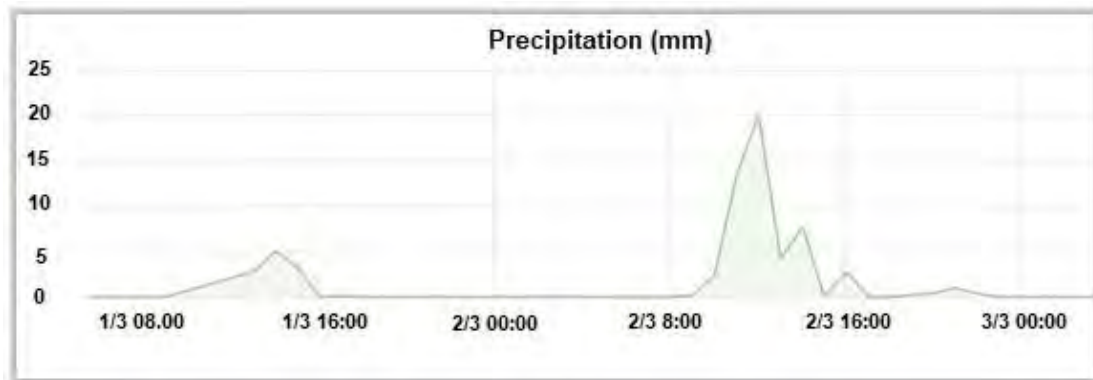


Figure 10-1 Rainfall recorded via on-site weather station 1st to 3rd March 2021

EnviroWorks advised Terrafirma Offshore to conduct opportunistic surface water quality monitoring on the 6th March 2021 within the flooded salt flats. Four samples were taken as shown in Figure 10-2 below.



Figure 10-2 Salt flat water sample locations 6th March



10.2 Results

The results of the 6th March 2021 surface water monitoring are provided in Table 10-2. The following can be concluded from the laboratory results:

- Samples SF2 and SF3 were comprised of predominantly dissolved nitrogen, whilst samples SF1 and SF4 had lower dissolved levels.
- SF1 had a higher total nitrogen concentration, which is expected given its location adjacent to algal mats.
- Across all sites nitrogen was largely organic, with very little ammonia.
- The mean nitrogen concentration across the four sites was 1.75 mg/L.
- Phosphorus was below detection limits at all sites.
- Electrical conductivity and TDS measurements indicate that surface water is saline to hypersaline on the salt flats.
- High levels of total dissolved solids in the samples from the bare salt flats indicate that the surface salt crust was dissolving into the ponded water on the salt flats.
- There were comparatively low levels of nitrogen at SF2, SF3 and SF4 (mean of 1.5 mg/L) compared with higher nitrogen levels in SF1 (2.5 mg/L) which is adjacent to the algal mats.

Table 10-2 Surface water sampling 6th March 2021 laboratory results

Sample	Units	PQL	SF1	SF2	SF3	SF4	Mean
Conductivity	mS/cm	0.01	84	74	85	73	79
Total Dissolved Solids	mg/L	5	55,000	46,000	57,000	45,000	50750
Total Nitrogen	mg/L	0.2	2.5	1.2	1.7	1.6	1.75
Total Nitrogen (Filtered)	mg/L	0.2	0.8	1.2	1.7	0.9	1.15
Total Kjeldahl Nitrogen	mg/L	0.2	2.5	1.2	1.7	1.6	1.75
Filtered Total Kjeldahl Nitrogen	mg/L	0.2	0.8	1.2	1.7	0.9	1.15
Total Phosphorus	mg/L	0.01	0.09	<0.01	0.02	0.01	0.04
Filtered Total Phosphorus	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Filterable Reactive Phosphorus	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	mg/L	0.02	0.04	0.03	0.05	0.03	0.0375
NOx-N	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01



11 REFERENCES

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- *Surface Water Assessment and Modelling*
- *Marine and Coastal Assessment and Modelling*
- *Nutrient Pathways Assessment and Modelling*

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APPENDIX A UWA MONTHLY WATER QUALITY REPORTS



Marine and Tidal Creek Water Quality Monitoring Project – November 2018

1. Introduction

This report was prepared for EnviroWorks Consulting by Paula Cartwright, University of Western Australia. The purpose of this report is to provide a monthly update of water quality data in accordance with the requirements under the contractual agreement between the University of Western Australia and K+S Salt.

2. Objectives

Assess spatial and temporal variability of key water quality parameters over an 18-month period within the Exmouth Gulf. Specific objectives of the monitoring program are

- 1) To characterise baseline water quality conditions
- 2) To account for seasonal variations in water quality
- 3) To assess water quality variability between locations, top and bottom waters, spring and neap tides
- 4) To collect additional data on wave, currents, temperature and salinity to validate hydrodynamic models

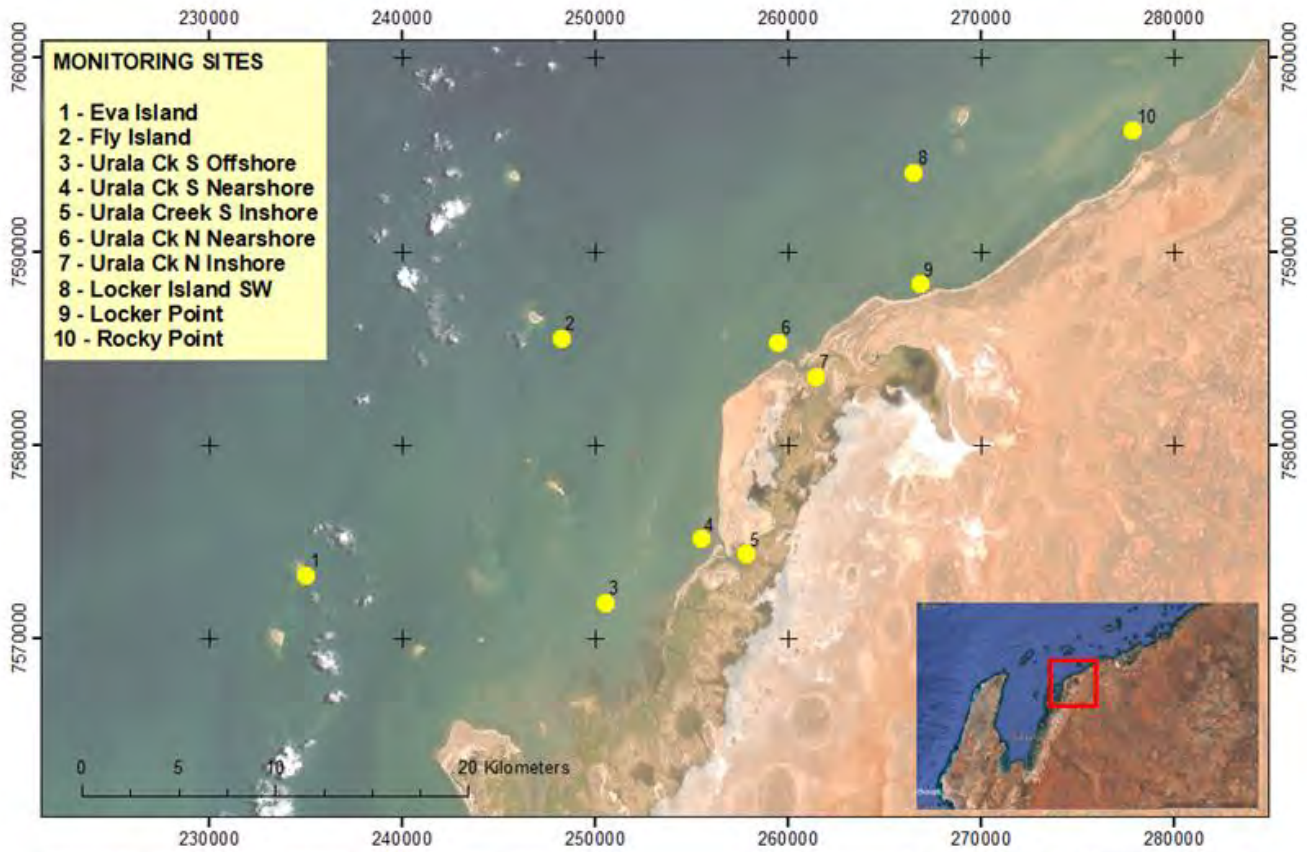
3. Monthly Monitoring Requirements

This report will only cover the requirements of the laboratory and in-situ water quality analysis. Further reporting of the wave, current and creek logger data will take place once that part of the project has begun.

The monthly water quality sampling requirements are

- Water quality sampling to take place at ten pre-determined sites along the Urala creek coastline (Figure 1).
- Samples of surface and bottom waters collected and analysed in a laboratory for the parameters listed in Table 1. Note: For November 2018, laboratory analysis of samples consisted of physical and chemical analysis only. A full suite analysis including metalloids, hydrocarbons and other parameters will occur once in every three months and will first be undertaken in December 2018
- In-situ measurements of water quality performed with a multiple parameter Sonde deployed from the boat for dip and read measurements (total dissolved sediments, turbidity, salinity, pH, dissolved oxygen, chlorophyll a and temperature) of top and bottom waters; (future sampling will encompass a full vertical profiling at each site).

Marine and Tidal Creek Water Quality Monitoring Sites - K+S Salt Pty Ltd



Prepared by Paula Cartwright, University of Western Australia for

 Date: 22/11/2018

Coordinate System: GDA2020 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA2020
Units: Meter

Sites	GPS Lat °	GPS Long °	Eastings	Northings
Eva Island	-21.92438	114.4364	235179	7573330
Fly Island	-21.81609	114.5655	248331	7585541
Urala Creek S-off shore	-21.94033	114.5853	250595	7571813
Urala Creek S-near shore	-21.91151	114.6337	255547	7575083
Urala Creek S-in shore	-21.9184	114.6554	257801	7574354
Urala Creek N-near shore	-21.81993	114.6736	259517	7585289
Urala Creek N-in shore	-21.83557	114.6915	261394	7583584
Locker Island-SW	-21.74156	114.7425	266515	7594074
Locker Point	-21.79347	114.7456	266920	7588330
Rocky Point	-21.72348	114.8523	277847	7596238

Figure 1: Map and spatial data for ten sites along the inshore, near shore and off shore sections of the Urala coast where monthly water quality sampling is being conducted.

Table 1: Water quality sampling parameters for laboratory and in-situ analysis at ten sites across the inshore, near shore and off shore regions of the Urala coastline, south west Pilbara. Note: Dissolved oxygen is only being analysed/recorded as field data and is not included in this table.

ANALYTE	SAMPLING INTERVAL		
	Months 1-6	Months 7-12	Months 13-18
Physical and Chemical Stressors			
<i>In-Situ Verification</i>			
pH	Monthly all sites all depths both laboratory and in-situ analysis where possible	Monthly 5 sites 2 x depths 5 sites 1 x depth	Monthly 5 sites 2 x depths 5 sites 1 x depth
Electrical Conductivity			
Turbidity			
Total Dissolved Solids (TDS)			
Total Suspended Solids (TSS)			
Chlorophyll-a			
<i>Laboratory Parameters</i>			
Total Nitrogen (includes TN, TKN, NOx-N)		all samples verified by laboratory and in-situ analysis where possible	only sites without in-situ verification to be laboratory analysed
Nitrate-N			
Nitrite-N			
Ammonia-N			
Reactive Phosphorus			
Total Phosphorus			
Total Organic Carbon			
<i>Metal and Metalloid Toxicants and Selenium</i>			
Total - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	every 3rd month	every 3rd month	every 3rd month
Dissolved - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	all depths	5 sites x 2 depths	5 sites x 2 depths
<i>Hydrocarbons</i>			
Organotins - TBT	laboratory analysis	5 sites x 1 depth	5 sites x 1 depth
Polycyclic Aromatic Hydrocarbons (PAH) - Standard		laboratory analysis	laboratory analysis
Benzene Toluene Ethyl Benzene Xylenes (BTEX)			
<i>Other Parameters</i>			
BOD			
Dissolved Organic Carbon - as an indicator of CDOM			

5. November 2018 Water Quality Sampling

The work was undertaken on the 16-17 November 2018, by Paula Cartwright and Mick O’Leary. The field work required two days on a vessel out of Exmouth, for which the services of TerraFirma Offshore Commercial Marine were used. Sites 1 -7 were sampled on day 1 and sites 8-10 were sampled on day 2.

Tidal Period

Neap tides

Table 1: Tides at Y Island over the water quality sampling period.

SAT 17 NOV		SUN 18 NOV	
HIGH	3:46 am 1.47 m	HIGH	5:25 am 1.37 m
LOW	10:58 am 0.73 m	LOW	12:19 pm 0.79 m
HIGH	5:51 pm 1.38 m	HIGH	7:25 pm 1.47 m
LOW	11:39 pm 1.07 m		

In-situ Results

The following are the results of in-situ measurements of the top and bottom waters at the ten sites along the offshore/onshore Urala coastline. The measurements were taken with an Exo Sonde 2 with handheld computer attachment (specifications [here](#)), using a dip and read method. Raw data available in shared Dropbox folder

Table 2: Results of in-situ water quality testing at two depths (surface and bottom) for ten sites (Figure 1) using an Exo sonde 2

Sites (Surface/bottom)	Depth m	Chlorophyll	Cond $\mu\text{S}/\text{cm}$	DO mg/L	fDOM QSU	Sal psu	TDS mg/L	Turb FNU	pH	Temp $^{\circ}\text{C}$
Eva Is (S)	-0.30	-0.01	52373.3	10.35	-0.72	34.63	34163	5.93	8.33	24.82
Eva Is (B)	-8.01	-0.66	52068.6	13.61	-0.64	34.59	34127	0.22	8.31	24.57
Fly Is (S)	-0.12	-1.12	52972	6.75	0.63	34.65	34193	-0.09	8.44	25.35
Fly Is (B)	-5.82	-0.67	52401.1	6.83	-0.81	34.59	34137	0.26	8.28	24.88
UCS-off (S)	-0.49	-0.32	55684.6	30.8	-0.09	35.74	35176	4.46	8.32	26.52
UCS-off (B)	-2.77	5.35	55473	7.52	-0.21	35.61	35061	131.77	8.23	26.49
UCS-near (S)	-0.33	0.76	58285.2	7.5	1.13	36.77	36096	6.87	8.22	27.60
UCS-near (B)	-1.75	0.86	58278.8	12.1	0.79	36.76	36090	55.61	8.2	27.60
UCS-in (S)	-0.09	1.34	69627.8	7.6	1.79	43.32	41767	10.52	8.19	29.38
UCS-in (B)	-1.00	0.43	69458.3	7.15	4.53	43.27	41717	14.97	8.16	29.31
UCN-near (S)	-0.17	0.3	55734.5	12.43	0.35	35.85	35267	0.09	8.25	26.43
UCN-near (B)	-4.58	-0.66	55441.6	6.44	0	35.7	35140	0.64	8.19	26.34
UCN-in (S)	-0.09	1.41	61580.8	5.1	0.43	38.58	37681	9.7	8.22	28.26
UCN-in (B)	-1.16	0.68	61801.1	4.67	1.41	38.78	37854	80.56	8.17	28.20
Locker Is-nw (S)	-0.12	0.3	53202.3	6.03	-1.11	34.68	34223	7.78	8.34	25.55
Locker Is-nw (B)	-7.03	-0.77	53253.9	6.01	-0.75	34.91	34426	0.69	8.31	25.29
Locker Point (S)	-0.62	-0.74	55534.5	6.07	-0.21	35.6	35058	1	8.29	26.55
Locker Point (B)	-3.58	-0.71	55322.3	5.71	-0.14	35.6	35047	1.28	8.29	26.36
Rocky Point (S)	-0.47	-0.74	54408.8	5.48	-0.56	35.27	34751	2.83	8.32	25.93
Rocky Point (B)	-4.36	-0.61	54316	5.48	-0.46	35.26	34739	2.86	8.32	25.85

Laboratory Results

See appendix

6. Quality Control

Laboratory Samples

Water samples collected in the field requiring transport to laboratory for analysis were conducted in accordance with the standards outlined by ANZECC and the Government of Western Australia Department of Water's field sampling guidelines. Items were filtered, refrigerated or frozen as required and reached the laboratory within 24-48 hours of collection at sea.

In-situ measurements

This was the first use of the multiparameter sonde in the field. The instrument had been calibrated prior to shipping and appears to have provided robust data. Prior to the next sampling occasion, the sonde will be re-calibrated with solutions designed specifically for the instrument which have since been purchased. It is expected this will fine-tune any small deviations (such as negative values in chlorophyll results).

7. Budget

The initial field trip required some expenses beyond the allocated budget that we hope to recoup through reduced expenditure as the project progresses (Table 5). The purchase of calibration solutions for the in-situ instrument had not been accounted for and were a significant expense. Additionally, it was considered appropriate that Mick O'Leary attend the first trip to oversee any issues that might arise, which increased the travel and accommodation expenses beyond the allocation that is only for one person. As all procedures ran smoothly it is expected that this won't be necessary for most of the future field work. The cost of the Coxswains 1 ticket upgrade was higher than had been previously priced however, this should produce further budget savings into the future by negating the need for the added cost of hiring a vessel master for some trips. Additionally, the future use of a hire car will be unnecessary for most of the time as accommodation is on site (TerraFirma HQ).

Expenditure that is likely to increase in cost for future field trips include hardware/filters, as these will need to be purchased (filters already owned were used for this trip) and these are accounted for in the budget. Also, freight charges will be higher on alternate months where a full suite of parameters are laboratory assessed requiring 3 x as many water samples to be returned to Perth.

Table 3: The expenses incurred undertaking the water quality sampling in November 2018 and the budgeted field costs.

Budget November	Actual Cost	Budgeted Cost
Field Trip		
Vessel Hire	4462.00	4000.00
Accommodation	550.00	450.00
Airport bus	40.00	0
Car Hire	275.00	240.00
Airfares	950.00	800.00
Freight	273.00	350.00
Misc.	37.00	0
Hardware/filters	43.34	405.00
Stationary	29.80	0
Calibration solutions	976.09	0
Hard drive for data storage (one off)	89.99	0
Dropbox for data sharing (monthly)	15.39	0
Field Trip Total	7741.61	6245.00
Other		
Coxswains Course	3544.00	3115.00
Australian Boating Manual	44.00	0
Other Total	3588.00	3155.00

Appendix
Laboratory Results

LABORATORY REPORT

Job Number: 18-17286
Revision: 00
Date: 27 November 2018

ADDRESS: University of WA

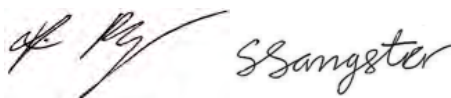
ATTENTION: Paula Cartwright

DATE RECEIVED: 19/11/2018

YOUR REFERENCE: University of WA; K+S Project

PURCHASE ORDER: K+S

APPROVALS:



Kim Rodgers
General Manager

Sean Sangster
Inorganics Supervisor

REPORT COMMENTS:

This report is issued by Analytical Reference Laboratory (WA) Pty Ltd
Samples are analysed on an as received basis unless otherwise noted.
Total Organic Carbon analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 218918

METHOD REFERENCES:

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377
Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561

ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 014	pH in Water
ARL No. 141	Chlorophyll-a and Pheophytin-a in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids
ARL No. 016	Total Suspended Solids
ARL No. 045	Turbidity
Subcontracting	See Report Comments section for more information.



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LABORATORY REPORT

University of WA

ARL Job No: 18-17286

Revision: 00

Date: 27 November 2018

Total Nitrogen in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-1 Rocky Point Top 18/11/2018	18-17286-2 Rocky Point Bottom 18/11/2018	18-17286-3 Locker Point Top 18/11/2018	18-17286-4 Locker Point Bottom 18/11/2018	18-17286-5 UCS - Off Top 17/11/2018
Total Nitrogen	0.2	mg/L	0.6	0.6	0.5	0.6	0.5
Total Kjeldahl Nitrogen	0.2	mg/L	0.6	0.6	0.5	0.6	0.5

Total Nitrogen in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-6 UCS - Off Bottom 17/11/2018	18-17286-7 Locker - SW Top 18/11/2018	18-17286-8 Locker - SW Bottom 18/11/2018	18-17286-9 EVA Top 17/11/2018	18-17286-10 EVA Bottom 17/11/2018
Total Nitrogen	0.2	mg/L	1.3	0.9	0.4	0.2	0.2
Total Kjeldahl Nitrogen	0.2	mg/L	1.3	0.9	0.4	0.2	0.2

Total Nitrogen in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-11 UCS - Inshore Top 17/11/2018	18-17286-12 UCS - Inshore Bottom 17/11/2018	18-17286-13 UCN - New Top 17/11/2018	18-17286-14 UCN - Near Bottom 17/11/2018	18-17286-15 Fly Top 17/11/2018
Total Nitrogen	0.2	mg/L	0.6	0.2	<0.2	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	0.6	0.2	<0.2	<0.2	<0.2

Total Nitrogen in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-16 Fly Bottom 17/11/2018	18-17286-17 NCN - Inshore Top 17/11/2018	18-17286-18 NCN - Inshore Bottom 17/11/2018	18-17286-19 UCS - Near Top 17/11/2018	18-17286-20 UCS - Near Bottom 17/11/2018
Total Nitrogen	0.2	mg/L	<0.2	0.2	<0.2	<0.2	0.5
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	0.2	<0.2	<0.2	0.5

Total Phosphorus in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-1 Rocky Point Top 18/11/2018	18-17286-2 Rocky Point Bottom 18/11/2018	18-17286-3 Locker Point Top 18/11/2018	18-17286-4 Locker Point Bottom 18/11/2018	18-17286-5 UCS - Off Top 17/11/2018
Total Phosphorus	0.01	mg/L	0.04	0.04	0.04	0.04	0.04

Total Phosphorus in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-6 UCS - Off Bottom 17/11/2018	18-17286-7 Locker - SW Top 18/11/2018	18-17286-8 Locker - SW Bottom 18/11/2018	18-17286-9 EVA Top 17/11/2018	18-17286-10 EVA Bottom 17/11/2018
Total Phosphorus	0.01	mg/L	0.04	0.04	0.04	0.04	0.04

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LABORATORY REPORT

University of WA

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Revision: 00

Date: 27 November 2018

Total Phosphorus in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-11 UCS - Inshore Top 17/11/2018	18-17286-12 UCS - Inshore Bottom 17/11/2018	18-17286-13 UCN - New Top 17/11/2018	18-17286-14 UCN - Near Bottom 17/11/2018	18-17286-15 Fly Top 17/11/2018
Total Phosphorus	0.01	mg/L	0.04	0.04	0.04	0.04	0.04

Total Phosphorus in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-16 Fly Bottom 17/11/2018	18-17286-17 NCN - Inshore Top 17/11/2018	18-17286-18 NCN - Inshore Bottom 17/11/2018	18-17286-19 UCS - Near Top 17/11/2018	18-17286-20 UCS - Near Bottom 17/11/2018
Total Phosphorus	0.01	mg/L	0.04	0.04	0.04	0.04	0.04

Ions by Discrete Analyser Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-1 Rocky Point Top 18/11/2018	18-17286-2 Rocky Point Bottom 18/11/2018	18-17286-3 Locker Point Top 18/11/2018	18-17286-4 Locker Point Bottom 18/11/2018	18-17286-5 UCS - Off Top 17/11/2018
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	<0.01	0.01	0.01	0.01	0.01
NOx-N	0.01	mg/L	<0.01	0.02	0.02	0.02	0.02
Nitrite-N	0.01	mg/L	<0.01	0.01	0.01	0.01	0.01

Ions by Discrete Analyser Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-6 UCS - Off Bottom 17/11/2018	18-17286-7 Locker - SW Top 18/11/2018	18-17286-8 Locker - SW Bottom 18/11/2018	18-17286-9 EVA Top 17/11/2018	18-17286-10 EVA Bottom 17/11/2018
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	0.02	0.01	0.01	0.01	0.02
NOx-N	0.01	mg/L	0.03	0.02	0.02	0.02	0.03
Nitrite-N	0.01	mg/L	0.01	0.01	0.01	0.01	0.01

LABORATORY REPORT

University of WA

ARL Job No: 18-17286

Revision: 00

Date: 27 November 2018

Ions by Discrete Analyser Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-11 UCS - Inshore Top 17/11/2018	18-17286-12 UCS - Inshore Bottom 17/11/2018	18-17286-13 UCN - New Top 17/11/2018	18-17286-14 UCN - Near Bottom 17/11/2018	18-17286-15 Fly Top 17/11/2018
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	0.01	0.01	0.01	0.01	0.01
NOx-N	0.01	mg/L	0.02	0.02	0.02	0.02	0.02
Nitrite-N	0.01	mg/L	0.01	0.01	0.01	0.01	0.01

Ions by Discrete Analyser Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-16 Fly Bottom 17/11/2018	18-17286-17 NCN - Inshore Top 17/11/2018	18-17286-18 NCN - Inshore Bottom 17/11/2018	18-17286-19 UCS - Near Top 17/11/2018	18-17286-20 UCS - Near Bottom 17/11/2018
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	0.01	0.01	0.01	0.01	<0.01
NOx-N	0.01	mg/L	0.02	0.02	0.02	0.02	<0.01
Nitrite-N	0.01	mg/L	0.01	0.01	0.01	0.01	<0.01

Physical Parameters Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-1 Rocky Point Top 18/11/2018	18-17286-2 Rocky Point Bottom 18/11/2018	18-17286-3 Locker Point Top 18/11/2018	18-17286-4 Locker Point Bottom 18/11/2018	18-17286-5 UCS - Off Top 17/11/2018
pH	0.1	pH units	8.2	8.2	8.2	8.2	8.2
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1
Conductivity	0.01	mS/cm	55	54	55	55	55
Total Dissolved Solids	5	mg/L	41,000	39,000	40,000	41,000	40,000
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5
Turbidity	0.1	NTU	2.2	2.2	1.2	1.2	1.1

Physical Parameters Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-6 UCS - Off Bottom 17/11/2018	18-17286-7 Locker - SW Top 18/11/2018	18-17286-8 Locker - SW Bottom 18/11/2018	18-17286-9 EVA Top 17/11/2018	18-17286-10 EVA Bottom 17/11/2018
pH	0.1	pH units	8.1	8.2	8.2	8.2	8.2
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1
Conductivity	0.01	mS/cm	55	54	54	54	53
Total Dissolved Solids	5	mg/L	39,000	39,000	40,000	38,000	40,000
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5
Turbidity	0.1	NTU	1.0	0.7	0.9	0.4	0.3

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Date: 27 November 2018

Physical Parameters Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-11 UCS - Inshore Top 17/11/2018	18-17286-12 UCS - Inshore Bottom 17/11/2018	18-17286-13 UCN - New Top 17/11/2018	18-17286-14 UCN - Near Bottom 17/11/2018	18-17286-15 Fly Top 17/11/2018
pH	0.1	pH units	8.1	8.1	8.1	8.1	8.1
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1
Conductivity	0.01	mS/cm	65	64	54	55	54
Total Dissolved Solids	5	mg/L	49,000	48,000	41,000	41,000	40,000
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5
Turbidity	0.1	NTU	3.5	3.2	0.7	0.9	0.4

Physical Parameters Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-16 Fly Bottom 17/11/2018	18-17286-17 NCN - Inshore Top 17/11/2018	18-17286-18 NCN - Inshore Bottom 17/11/2018	18-17286-19 UCS - Near Top 17/11/2018	18-17286-20 UCS - Near Bottom 17/11/2018
pH	0.1	pH units	8.1	8.1	8.1	8.1	8.1
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1
Conductivity	0.01	mS/cm	54	58	58	56	56
Total Dissolved Solids	5	mg/L	38,000	42,000	42,000	42,000	41,000
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5
Turbidity	0.1	NTU	0.8	1.5	1.6	1.0	1.0

Subcontracting Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-1 Rocky Point Top 18/11/2018	18-17286-2 Rocky Point Bottom 18/11/2018	18-17286-3 Locker Point Top 18/11/2018	18-17286-4 Locker Point Bottom 18/11/2018	18-17286-5 UCS - Off Top 17/11/2018
Total Organic Carbon	1	mg/L	1	1	1	1	<1

Subcontracting Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-6 UCS - Off Bottom 17/11/2018	18-17286-7 Locker - SW Top 18/11/2018	18-17286-8 Locker - SW Bottom 18/11/2018	18-17286-9 EVA Top 17/11/2018	18-17286-10 EVA Bottom 17/11/2018
Total Organic Carbon	1	mg/L	<1	<1	<1	<1	1

Subcontracting Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-11 UCS - Inshore Top 17/11/2018	18-17286-12 UCS - Inshore Bottom 17/11/2018	18-17286-13 UCN - New Top 17/11/2018	18-17286-14 UCN - Near Bottom 17/11/2018	18-17286-15 Fly Top 17/11/2018
Total Organic Carbon	1	mg/L	2	2	1	1	<1

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LABORATORY REPORT

University of WA

ARL Job No: 18-17286

Revision: 00

Date: 27 November 2018

Subcontracting Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-16 Fly Bottom 17/11/2018	18-17286-17 NCN - Inshore Top 17/11/2018	18-17286-18 NCN - Inshore Bottom 17/11/2018	18-17286-19 UCS - Near Top 17/11/2018	18-17286-20 UCS - Near Bottom 17/11/2018
Total Organic Carbon	1	mg/L	<1	1	1	1	1

Result Definitions

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting

* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

Marine and Tidal Creek Water Quality Monitoring Project – December 2018

1. Introduction

This report was prepared for EnviroWorks Consulting by Paula Cartwright, University of Western Australia. The purpose of this report is to provide a monthly update of water quality data in accordance with the requirements under the contractual agreement between the University of Western Australia and K+S Salt.

2. Objectives

Assess spatial and temporal variability of key water quality parameters over an 18-month period within the Exmouth Gulf. Specific objectives of the monitoring program are

- 1) To characterise baseline water quality conditions
- 2) To account for seasonal variations in water quality
- 3) To assess water quality variability between locations, top and bottom waters, spring and neap tides
- 4) To collect additional data on wave, currents, temperature and salinity to validate hydrodynamic models

3. Monthly Monitoring Requirements

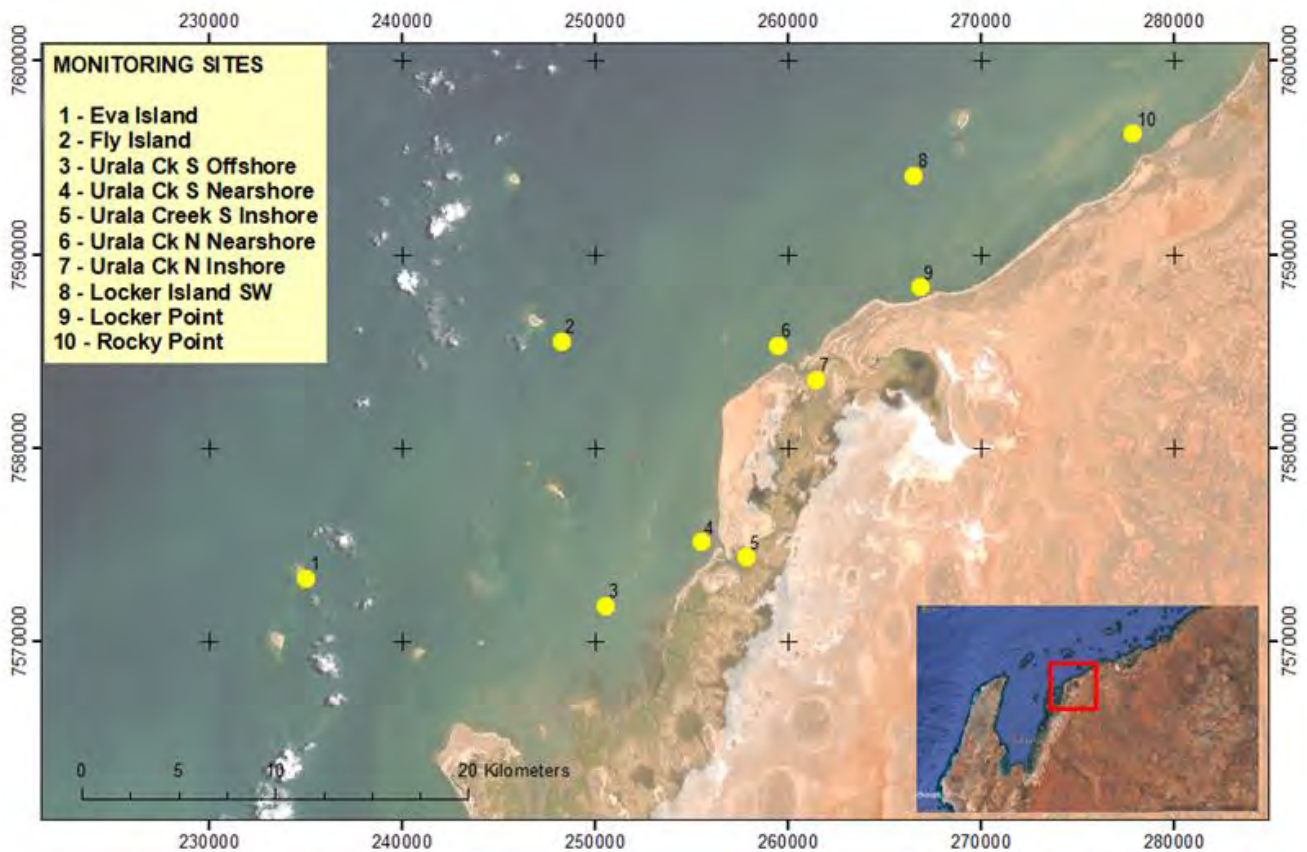
This report will only cover the requirements of the laboratory and in-situ water quality analysis. Further reporting of the wave, current and creek logger data will take place once that part of the project has begun.

The monthly water quality sampling requirements are

- Water quality sampling to take place at ten pre-determined sites along the Urala creek coastline (Figure 1) as well as 2 duplicates and a blank.
- Samples of surface and bottom waters collected and analysed in a laboratory for the parameters listed in Table 1. The parameters for laboratory analysis have been increased since the November sampling to include toxicants each month (previously each season). The bottling needs for laboratory analysis of these parameters consist of the following for each depth at each site:
 - 2 x 1 litre glass bottle
 - 1 x 500 mL polycarbonate bottle
 - 2 x 250 mL plastic bottle
 - 4 x 125 mL plastic bottle
 - 4 x 40 mL glass vial
- This makes a total of 300 bottles (from 2 depths at 10 sites, plus 3 QA sites) and requires 6 x 35 L eskies to carry.
- In-situ measurements of water quality performed with a multiple parameter Sonde deployed from the boat for dip and read measurements (total dissolved sediments,

turbidity, salinity, pH, dissolved oxygen, chlorophyll a and temperature) of top and bottom waters; (future sampling will encompass a full vertical profiling at each site).

Marine and Tidal Creek Water Quality Monitoring Sites - K+S Salt Pty Ltd



Prepared by Paula Cartwright, University of Western Australia for

 Date: 22/11/2018

Coordinate System: GDA2020 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA2020
Units: Meter

Sites	GPS Lat °	GPS Long °	Eastings	Northings
Eva Island	-21.92438	114.4364	235179	7573330
Fly Island	-21.81609	114.5655	248331	7585541
Urala Creek S-off shore	-21.94033	114.5853	250595	7571813
Urala Creek S-near shore	-21.91151	114.6337	255547	7575083
Urala Creek S-in shore	-21.9184	114.6554	257801	7574354
Urala Creek N-near shore	-21.81993	114.6736	259517	7585289
Urala Creek N-in shore	-21.83557	114.6915	261394	7583584
Locker Island-SW	-21.74156	114.7425	266515	7594074
Locker Point	-21.79347	114.7456	266920	7588330
Rocky Point	-21.72348	114.8523	277847	7596238

Figure 1: Map and spatial data for ten sites along the inshore, near shore and off shore sections of the Urala coast where monthly water quality sampling is being conducted. **Note: Locker Point (site 9) has been moved approximately three hundred metres east and the new coordinates are as follows: -21.7910537, 114.7473817; 267100E, 7588600N.**

Table 1: Water quality sampling parameters for laboratory and in-situ analysis at ten sites across the inshore, near shore and off shore regions of the Urala coastline, south west Pilbara. Note: Dissolved oxygen is only being analysed/recorded as field data and is not included in this table.

ANALYTE	SAMPLING INTERVAL		
	Months 1-6	Months 7-12	Months 13-18
Physical and Chemical Stressors			
<i>In-Situ Verification</i>			
pH	Monthly all sites all depths both laboratory and in-situ analysis where possible	Monthly 5 sites 2 x depths 5 sites 1 x depth	Monthly 5 sites 2 x depths 5 sites 1 x depth
Electrical Conductivity			
Turbidity			
Total Dissolved Solids (TDS)			
Total Suspended Solids (TSS)			
Chlorophyll-a			
<i>Laboratory Parameters</i>			
Total Nitrogen (includes TN, TKN, NOx-N)		all samples verified by laboratory and in-situ analysis where possible	only sites without in-situ verification to be laboratory analysed
Nitrate-N			
Nitrite-N			
Ammonia-N			
Reactive Phosphorus			
Total Phosphorus			
Total Organic Carbon			
Metal and Metalloid Toxicants and Selenium			
Total - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	Monthly all depths	Monthly (TBA) 5 sites x 2 depths 5 sites x 1 depth	Monthly (TBA) 5 sites x 2 depths 5 sites x 1 depth
Dissolved - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se			
Hydrocarbons			
Organotins - TBT	laboratory analysis	laboratory analysis	laboratory analysis
Polycyclic Aromatic Hydrocarbons (PAH) - Standard			
Benzene Toluene Ethyl Benzene Xylenes (BTEX)			
Other Parameters			
BOD			
Dissolved Organic Carbon - as an indicator of CDOM			

5. December 2018 Water Quality Sampling

The work was undertaken on the 8th – 9th December 2018, by Paula Cartwright. The field work required two days on a vessel out of Exmouth, for which the services of TerraFirma Offshore Commercial Marine were used. Sites 3-10 were sampled on day 1 and sites 1 and 2 were sampled on day 2.

For day 1, the conditions in the Exmouth Gulf were difficult (20 knot SE winds, rough seas, skipper almost called off the trip). It took 3 hours to reach the first site, Locker Point. Locker Point had been moved due to the new proposed location for the jetty and the new coordinates were used to navigate to the site. At this stage our instructions were to replace Rocky Point to this new site however it became clear that there may have been an error as the new “Rocky Point” was very close to Locker Point. A message was sent via phone for clarification however a reply was not received until all three sites at this Eastern end of the sampling locations had been completed and we were heading up Urala Creek North. It turned out that it was Locker Point that was being moved to the new site, not Rocky Point. There was no time to return to the original Rocky Point site as we knew the conditions for the following day would be bad (there was a chance we could not return for a second day of sampling) and we needed to get as many more sites done as possible. Therefore, both the original and the new Locker Points were sampled, and the original Rocky Point was not. In all we sampled 8 sites on day one and were on the water for 12.5 hours.

Day 2 it was not possible to go into the Gulf in the morning due to heavy conditions (25-30 knot winds) however, at lunchtime there was an easing of conditions and we had a two to three-hour window to get the last two sites sampled. Expecting this may happen, we had left the closest two sites (Eva and Fly Islands) for day 2 and managed to get over and back within the time frame. There was no possibility of getting all the way to Rocky Point on this day and so Rocky Point has not been sampled this month.

Tidal Period

Spring tides

Table 1: Tides at Y Island over the December 2018 water quality sampling period.

8	0533	0.12
	1154	1.74
	SA 1706	0.65
	2319	2.13
9	0609	0.09
	1230	1.74
	SU 1740	0.65
	2352	2.08

In-situ Results

In contrast to the November sampling, in-situ data in December was collected using a vertical profiling method rather than a top and bottom logging. The sonde was set to continuous

mode, with data logging at one second intervals, and the instrument was slowly lowered from the surface to bottom waters. This has provided up to 30 data points per site, dependent on the depth. Raw data available in shared Dropbox>>>Raw Data file.

Laboratory Results

See Dropbox >> Raw Data file

6. Quality Control

Laboratory Samples

Water samples collected in the field requiring transport to laboratory for analysis were conducted in accordance with the standards outlined by ANZECC and the Government of Western Australia Department of Water's field sampling guidelines. Items were filtered, refrigerated or frozen as required and reached the laboratory within 24-54 hours of collection at sea.

Two replicates sampling were conducted, the first at Locker Point (new) and the second at Urala Creek South. These were named Tent Island (top and bottom) on bottle labels and the chain of command given to ARL labs. A dummy site was also created containing only distilled water. This was named Locker SW.

The chlorophyll samples which are filtered in Exmouth onto filter papers and frozen within hours of collection, were left in the freezer at Terrafirma HQ this month. They will be returned to the laboratory on the next sampling occasion. Being frozen for ~ 30 days will not affect their analysis.

In-situ measurements

This was the second use of the multiparameter sonde in the field. The instrument was successfully calibrated prior to deployment for conductivity, turbidity, depth and pH. There was an issue with calibration for the Chlorophyll/FDOM, with the software reporting an error and factory calibration was reverted to in this instance. Prior to the next sampling occasion technical phone support from Xylem in Brisbane will be accessed to resolve this issue (they were closed when issue occurred this month). It is expected this will fine-tune any small deviations (such as negative values in chlorophyll results).

A note on chlorophyll: The sonde is not designed to provide quantitative data on chlorophyll rather, it provides relative values. Therefore, we can still use the values to detect changes within and between sites.

7. Budget

The budget is presented in Table 5. While the monthly expenses were significantly (>\$1000) less than the previous months expenses they were still higher than the initial budget allowance. This is primarily due to the vessel hire costs which come in over the \$4000 we allowed for this expense. Due to the nature of the sampling sites (remote, unchartered, difficult sea conditions, shallow creeks) we believe there are no other vessel charters appropriate to do this work and therefore the expense is justified. Additionally, this month due to the very rough sea conditions it was not possible to find a local volunteer to assist with the niskin bottle water sampling (requires two people) and it was necessary to pay the vessel

crew to assist with this task. Considering that this extra charge was higher than an airfare for another University member to attend the field trip, it may make more sense for two people to attend the monthly trips, particularly considering the difficulty of moving 6 eskies through the airports.

The filters (syringe and membrane for 2 bottles per sample, 46 in total per month) have not been invoiced to us yet so we are not sure how they will differ from our budgeted cost.

Table 2: The actual expenses incurred undertaking the water quality sampling in December 2018 and the budgeted field costs.

Budget November	Actual Cost	Budgeted Cost
Field Trip		
Vessel Hire (inc Crew Hire \$600)	5445.54	4000.00
Accommodation	Included in above	450.00
Airport bus	70.00	0
Car Hire	0	240.00
Airfares incl. prepaid freight	952.08	800.00
Freight (airport excess)	50.00	350.00
Misc.	47.00	0
Hardware/filters	83.40	405.00
Dropbox for data sharing (monthly)	15.39	0
Field Trip Total	6663.41	6245.00

Marine and Tidal Creek Water Quality Monitoring Project – January 2019

1. Introduction

This report was prepared for EnviroWorks Consulting by Paula Cartwright, University of Western Australia. The purpose of this report is to provide a monthly update of water quality data in accordance with the requirements under the contractual agreement between the University of Western Australia and K+S Salt.

2. Objectives

Assess spatial and temporal variability of key water quality parameters over an 18-month period within the Exmouth Gulf. Specific objectives of the monitoring program are

- 1) To characterise baseline water quality conditions
- 2) To account for seasonal variations in water quality
- 3) To assess water quality variability between locations, top and bottom waters, spring and neap tides
- 4) To collect additional data on wave, currents, temperature and salinity to validate hydrodynamic models

3. Monthly Monitoring Requirements

The monthly water quality sampling requirements are

- Water quality sampling to take place at ten pre-determined sites along the Urala creek coastline (Figure 1) as well as 2 duplicates and a blank.
- Samples of surface and bottom waters collected and analysed in a laboratory for the parameters listed in Table 1. The parameters for laboratory analysis have been increased since the November sampling to include toxicants each month (previously each season). The bottling needs for laboratory analysis of these parameters consist of the following for each depth at each site:
 - 2 x 1 litre glass bottle
 - 1 x 500 mL polycarbonate bottle
 - 2 x 250 mL plastic bottle
 - 4 x 125 mL plastic bottle
 - 4 x 40 mL glass vial
- This makes a total of 300 bottles (from 2 depths at 10 sites, plus 3 QA sites) and requires 6 x 35 L eskies to carry.
- In-situ measurements of water quality performed with a multiple parameter Sonde deployed from the boat for dip and read measurements (total dissolved sediments, turbidity, salinity, pH, dissolved oxygen, chlorophyll a and temperature) of top and bottom waters; (future sampling will encompass a full vertical profiling at each site).

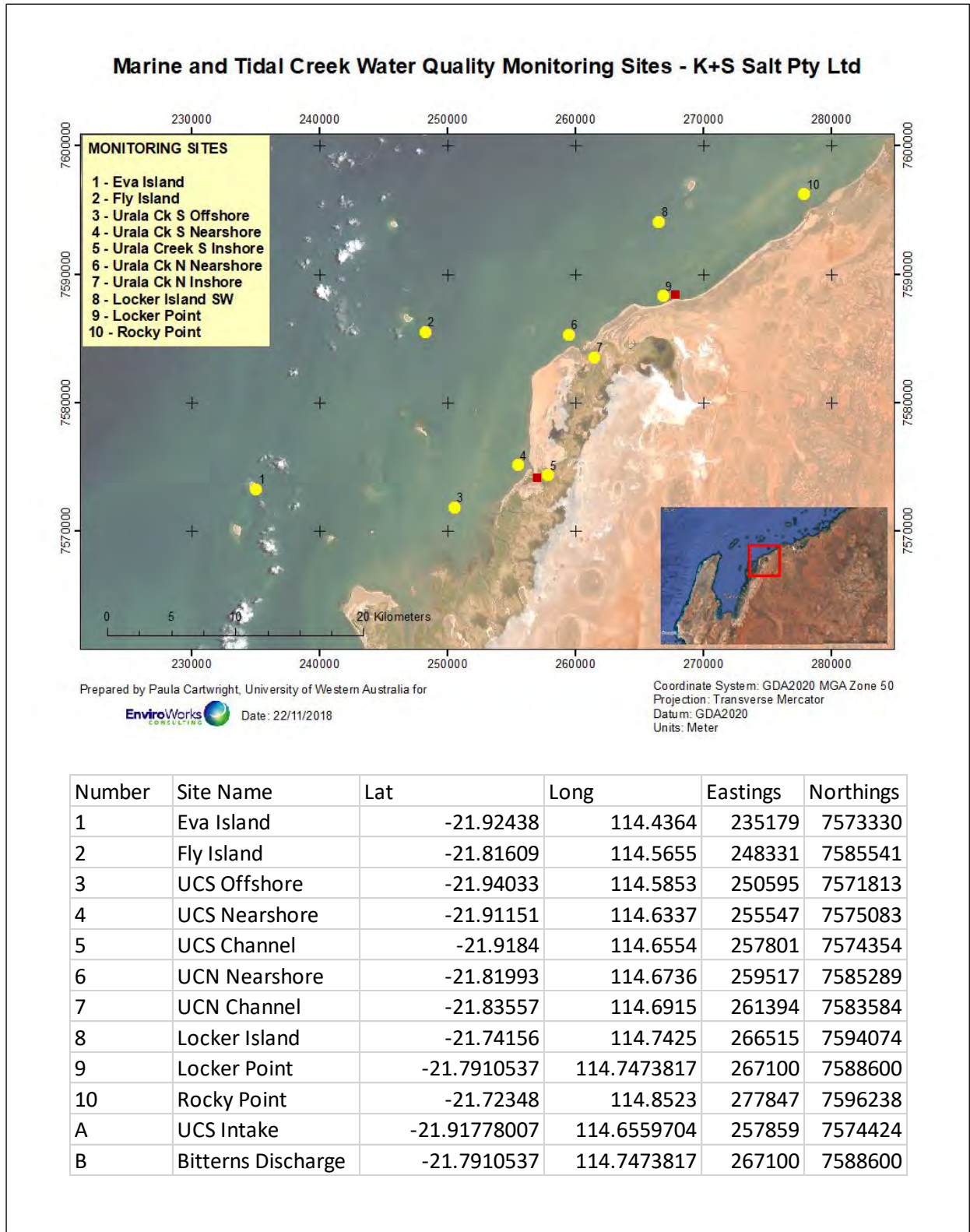


Figure 1: Map and spatial data for ten water collection sites (1-10) and two logger deployment sites (A, B) along the inshore, near shore and offshore sections of the Urala coast, south-west Pilbara. Note: The Urala Creek South and Urala Creek North inshore sites are also known as UCS and UCN Channels.

Table 1: Water quality sampling parameters for laboratory and in-situ analysis at ten sites across the inshore, near shore and off shore regions of the Urala coastline, south west Pilbara. Note: Dissolved oxygen is only being analysed/recorded as field data and is not included in this table.

ANALYTE	SAMPLING INTERVAL		
	Months 1-6	Months 7-12	Months 13-18
Physical and Chemical Stressors			
<i>In-Situ Verification</i>			
pH	Monthly all sites all depths both laboratory and in-situ analysis where possible	Monthly 5 sites 2 x depths 5 sites 1 x depth	Monthly 5 sites 2 x depths 5 sites 1 x depth
Electrical Conductivity			
Turbidity			
Total Dissolved Solids (TDS)			
Total Suspended Solids (TSS)			
Chlorophyll-a			
<i>Laboratory Parameters</i>			
Total Nitrogen (includes TN, TKN, NOx-N)		all samples verified by laboratory and in-situ analysis where possible	only sites without in-situ verification to be laboratory analysed
Nitrate-N			
Nitrite-N			
Ammonia-N			
Reactive Phosphorus			
Total Phosphorus			
Total Organic Carbon			
Metal and Metalloid Toxicants and Selenium			
Total - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	Monthly all depths	Monthly (TBA) 5 sites x 2 depths 5 sites x 1 depth	Monthly (TBA) 5 sites x 2 depths 5 sites x 1 depth
Dissolved - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se			
Hydrocarbons			
Organotins - TBT	laboratory analysis	laboratory analysis	laboratory analysis
Polycyclic Aromatic Hydrocarbons (PAH) - Standard			
Benzene Toluene Ethyl Benzene Xylenes (BTEX)			
Other Parameters			
BOD			
Dissolved Organic Carbon - as an indicator of CDOM			

5. January 2019 Water Quality Sampling

The work was undertaken on the 9th – 10th January 2019, by Paula Cartwright. The field work required two days on a vessel out of Exmouth, for which the services of TerraFirma

Offshore Commercial Marine were used. Sites 3-9 were sampled on day 1 and sites 1, 2 and 3 were sampled on day 2. Loggers were deployed at both the bitterns discharge site and the UCS intake site on day 1.

Loggers

RBRsolo3 D|wave16 loggers were deployed at Urala Creek South and Locker Point. These are depth loggers that measure tides and waves. A single turbidity logger was deployed at Urala Creek South. Both these loggers will be removed, and data downloaded after one month. They will be re-deployed with the turbidity logger being moved to the Locker Point site.

Hobo conductivity loggers are also to be deployed at both locations however, that did not occur this month due to the shipment of faulty loggers by OneTemp SA. The company was contacted and new loggers were shipped which we received upon return to Exmouth at the end of the second day of fieldwork. The loggers were configured and given to Daemon Bass (TerraFirma owner/operator) who will deploy them as soon possible (potentially 20/01/19).

Tidal Period

Half way between spring and neap tides

Table 1: Tides at Y Island over the January 2019 water sampling period.

9	0016	1.98
	0659	0.14
	WE 1317	1.73
	1835	0.66
10	0047	1.95
	0727	0.17
	TH 1344	1.73
	1907	0.66

In-situ Results

As per the December in-situ sampling, a vertical profiling method was employed as opposed to a top and bottom logging. The sonde was set to continuous mode, with data logging at one second intervals, and the instrument was slowly lowered from the surface to bottom waters. The procedure was performed even slower than previously so as to maximise the number of data points. This has provided up to 90 data points per site, dependent on the depth. Raw data available in shared Dropbox>>Raw Data file.

Laboratory Results

Will be posted as soon as results are received. See Dropbox >> Raw Data file.

6. Quality Control

Laboratory Samples

Water samples collected in the field requiring transport to laboratory for analysis were conducted in accordance with the standards outlined by ANZECC and the Government of Western Australia Department of Water's field sampling guidelines. Items were filtered,

refrigerated or frozen as required and reached the laboratory within 24-54 hours of collection at sea.

Two replicates samples of top and bottom waters were taken at Eva Island. These were named Tent Island (top and bottom) on bottle labels and on the chain of command given to ARL labs. A dummy site was also created using filtered tap water. This was named Locker SW.

Chlorophyll filter paper samples from both December and January will be analysed in this round of ARL lab work. The December chlorophyll samples were left in the freezer at Terrafirma HQ last month. Being frozen for ~ 30 days does not affect their analysis.

7. Budget

The budget is presented in Table 5. The monthly expenses were slightly reduced from the previous months expenses mainly due to airfares being reduced at this time of year. The field trip costs were only slightly (\$375.00) over budget this month.

Table 2: The actual expenses incurred undertaking the water quality sampling in January 2019 and the budgeted field costs.

Budget November	Actual Cost	Budgeted Cost
Field Trip		
Vessel Hire (inc Crew Hire \$676)	5551.87	4000.00
Accommodation	Included in above	450.00
Airport bus (Learmonth) and taxi fare (Perth)	68.98	0
Car Hire	0	240.00
Airfares	490	800.00
Freight (airport excess)	390	350.00
Misc.	48.09	0
Hardware	55.65	405.00
Dropbox for data sharing	15.39	0
Field Trip Total	6619.98	6245.00

Marine and Tidal Creek Water Quality Monitoring Project – February 2019

1. Introduction

This report was prepared for EnviroWorks Consulting by Paula Cartwright, University of Western Australia. The purpose of this report is to provide a monthly update of water quality data in accordance with the requirements under the contractual agreement between the University of Western Australia and K+S Salt.

2. Objectives

Assess spatial and temporal variability of key water quality parameters over an 18-month period within the Exmouth Gulf. Specific objectives of the monitoring program are

- 1) To characterise baseline water quality conditions
- 2) To account for seasonal variations in water quality
- 3) To assess water quality variability between locations, top and bottom waters, spring and neap tides
- 4) To collect additional data on wave, currents, temperature and salinity to validate hydrodynamic models

3. Monthly Monitoring Requirements

The monthly water quality sampling requirements are

- Water quality sampling to take place at ten pre-determined sites along the Urala creek coastline (Figure 1) as well as 2 duplicates and a blank.
- Samples of surface and bottom waters collected and analysed in a laboratory for the parameters listed in Table 1. The parameters for laboratory analysis have been increased since the November sampling to include toxicants each month (previously each season). The bottling needs for laboratory analysis of these parameters consist of the following for each depth at each site:
 - 2 x 1 litre glass bottle
 - 1 x 500 mL polycarbonate bottle
 - 2 x 250 mL plastic bottle
 - 4 x 125 mL plastic bottle
 - 4 x 40 mL glass vial
- This makes a total of 300 bottles (from 2 depths at 10 sites, plus 3 QA sites) and requires 6 x 35 L eskies to carry.
- In-situ measurements of water quality performed with a multiple parameter Sonde deployed from the boat for dip and read measurements (total dissolved sediments, turbidity, salinity, pH, dissolved oxygen, chlorophyll a and temperature) of top and bottom waters; (future sampling will encompass a full vertical profiling at each site).

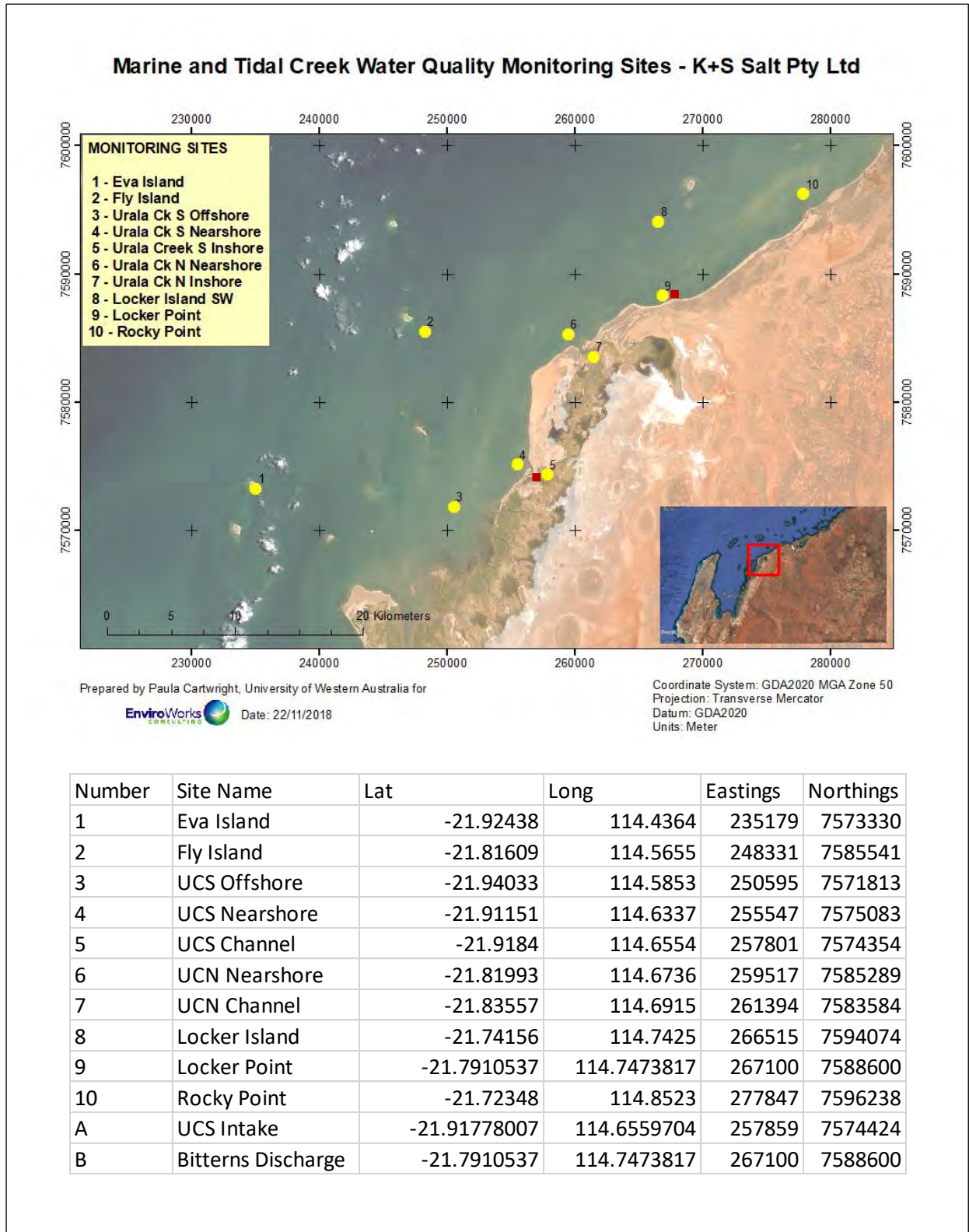


Figure 1: Map and spatial data for ten water collection sites (1-10) and two logger deployment sites (A, B) along the inshore, near shore and offshore sections of the Urala coast, south-west Pilbara. Note: The Urala Creek South and Urala Creek North inshore sites are also known as UCS and UCN Channels.

Table 1: Water quality sampling parameters for laboratory and in-situ analysis at ten sites across the inshore, near shore and off shore regions of the Urala coastline, south west Pilbara. Note: Dissolved oxygen is only being analysed/recorded as field data and is not included in this table.

ANALYTE	SAMPLING INTERVAL		
	Months 1-6	Months 7-12	Months 13-18
Physical and Chemical Stressors			
<i>In-Situ Verification</i>			
pH	Monthly all sites all depths both laboratory and in-situ analysis where possible	Monthly 5 sites 2 x depths 5 sites 1 x depth	Monthly 5 sites 2 x depths
Electrical Conductivity			
Turbidity			
Total Dissolved Solids (TDS)			
Total Suspended Solids (TSS)			
Chlorophyll-a			
<i>Laboratory Parameters</i>			
Total Nitrogen (includes TN, TKN, NOx-N)		all samples verified	only sites without in-situ verification
Nitrate-N		by laboratory and in-situ analysis where possible	to be laboratory analysed
Nitrite-N			
Ammonia-N			
Reactive Phosphorus			
Total Phosphorus			
Total Organic Carbon			
<i>Metal and Metalloid Toxicants and Selenium</i>			
Total - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	Monthly	Monthly (TBA)	Monthly (TBA)
Dissolved - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	all depths	5 sites x 2 depths	5 sites x 2 depths
<i>Hydrocarbons</i>			
Organotins - TBT		5 sites x 1 depth	5 sites x 1 depth
Polycyclic Aromatic Hydrocarbons (PAH) - Standard	laboratory analysis	laboratory analysis	laboratory analysis
Benzene Toluene Ethyl Benzene Xylenes (BTEX)			
<i>Other Parameters</i>			
BOD			
Dissolved Organic Carbon - as an indicator of CDOM			

4. February 2019 Water Quality Sampling

Overview

The work was undertaken on the 9th – 11th February 2019, by Paula Cartwright and Mick O’Leary. The field work required three days on a vessel out of Exmouth, for which the services of TerraFirma Offshore Commercial Marine were used. ADCP profiling of Urala

Creek South was undertaken on days one and two. Sites 1, 3, 4 and 5 were sampled on day two and sites 2, 6, 7, 8, 9 and 10 were sampled on day three. Loggers which were deployed in January at Urala Creek south and Locker Point were retrieved, and data uploaded before being re-deployed in the same locations.

Loggers

The loggers had been deployed in January as follows:

Urala Creek South –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x Hobo conductivity logger
- 1 x Turbidity logger

Locker Point –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x Hobo conductivity logger

The loggers all returned sound data. The turbidity logger's wiper blade was effective and there was no fouling on the sensor.

The conductivity loggers had a built-in default configuration for maximum salinity reading (~55,000 $\mu\text{s}/\text{cm}$) which did not capture some of the periods of high salinity. This default has been changed to 60,000 $\mu\text{s}/\text{cm}$ for the February deployment and will be reviewed again in March.

The Hobo loggers purchased from OneTemp SA were faulty and required factory replacement. The replacements did not arrive in time to be deployed on this field trip however, they were configured to start logging after 18th January and were deployed by TerraFirma Offshore on January 20th. Therefore, there is not a full month's data.

All logger data is available in the K+S Dropbox file.

RBR data is in two formats, Excel files and Ruskin files (require Ruskin software to open). Hobo data is also in two formats and requires HOBOWare software to open the non-excel files. While it is not necessary to view the data in these software applications, they are useful for visual interpretation of the data.

Turbidity data is a text file which can be opened in any editor. File output format information is on page 10 of the accompanying manual.

RBR*solo* loggers and Hobo conductivity loggers were re-deployed at Urala Creek South and Locker Point. A single turbidity logger was re-deployed at Urala Creek South. All five loggers will be removed, and data downloaded again in March. They will then be re-deployed apart from the turbidity logger which was only a two-month deployment/hire.

Creek Profiling

ADCP (depth and current profiler) transects of Urala Creek South were conducted on both ebb and flood tides over two days (one tidal period per day). The flood tide was measured on

day 1 and the ebbing tide on day 2. At the time of writing this report there has not yet been a discussion with Water Technology to determine if the data is adequate for modelling purposes or if more profiling is necessary. The data is available on the K+S Dropbox folder under Logger Data>>ADCP. The file output directory in the same folder contains the file numbers pertaining to each transect.

Tidal Period

A few days after spring tides.

Table 2: Tides at Y Island over the February 2019 water sampling period.

9	0106	1.96
	0725	0.20
SA	1340	1.89
	1928	0.52
10	0136	1.91
	0749	0.26
SU	1405	1.92
	2004	0.54
11	0209	1.83
	0814	0.36
MO	1433	1.94
	2044	0.57

In-situ Results

In-situ sampling was undertaken using a vertical profiling method opposed to a top and bottom logging. The sonde was set to continuous mode, with data logging at one second intervals, and the instrument was slowly lowered from the surface to bottom waters. This has provided up to 90 data points per site, dependent on the depth. Raw data available in K+S Dropbox>>Raw Data file>>In-Situ Water Quality.

The dissolved oxygen meter which is separate to the Sonde was not available on day 3 of the field sampling and therefore there is no DO readings for water samples taken that day (sites 2, 6,7,8,9,10).

Laboratory Results

The ARL analysis results are posted as soon as they are received. See K+S Dropbox >> Raw Data file.

5. Quality Control

In-Situ Instrument

The Exo Sonde was calibrated for pH, Conductivity and Turbidity prior to use in the field on this sampling trip.

Laboratory Samples

Water samples collected in the field requiring transport to laboratory for analysis were conducted in accordance with the standards outlined by ANZECC and the Government of Western Australia Department of Water's field sampling guidelines. Items were filtered, refrigerated or frozen as required and reached the laboratory within 24-54 hours of collection at sea.

Two replicates samples of top and bottom waters were taken at Urala Creek North. These were named Tent Island (top and bottom) on bottle labels and on the chain of command given to ARL labs. A dummy site was also created using Exmouth tap water. This was named Locker SW.

6. Budget

The budget is presented in Table 5. There was increased usage of the vessel this month due to the extensive creek profiling of Urala Creek South, and the need to deploy the conductivity loggers outside of the usual field trip. Vessel hire in this months budget is for four days instead of the usual two days. This almost doubles the monthly expenses as vessel hire is the largest cost for this field work. Additionally the field work this month was performed by both Paula Cartwright and Mick O'Leary and therefore required airfares and accommodation for two people.

Table 3: The actual expenses incurred undertaking the water quality sampling in January 2019 and the budgeted field costs.

Budget February	Actual Cost	Budgeted Cost
Field Trip		
Vessel Hire x 3 days	7666.77	4000.00
Extra day for loggers	2529.51	0
Accommodation	Included in above	450.00
Airport bus (Learmonth) and taxi fare (Perth)	0	0
Car Hire	458.38	240.00
Airfares	1023.87	800.00
Freight (airport excess)	390	350.00
Misc.	0	0
Hardware	0	405.00
Dropbox for data sharing	15.39	0
Field Trip Total	12083.92	6245.00

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 - 2 x 1 litre glass bottle
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 - 2 x 250 mL plastic bottle
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 - 4 x 40 mL glass vial
- This makes a total of 300 bottles (from 2 depths at 10 sites, plus 3 QA sites) and requires 5/6 x 35 L eskies to carry.
- In-situ measurements of water quality performed with a multiple parameter Sonde deployed from the boat for dip and read measurements (total dissolved sediments, turbidity, salinity, pH, dissolved oxygen, chlorophyll a and temperature) of top and bottom waters; (future sampling will encompass a full vertical profiling at each site).

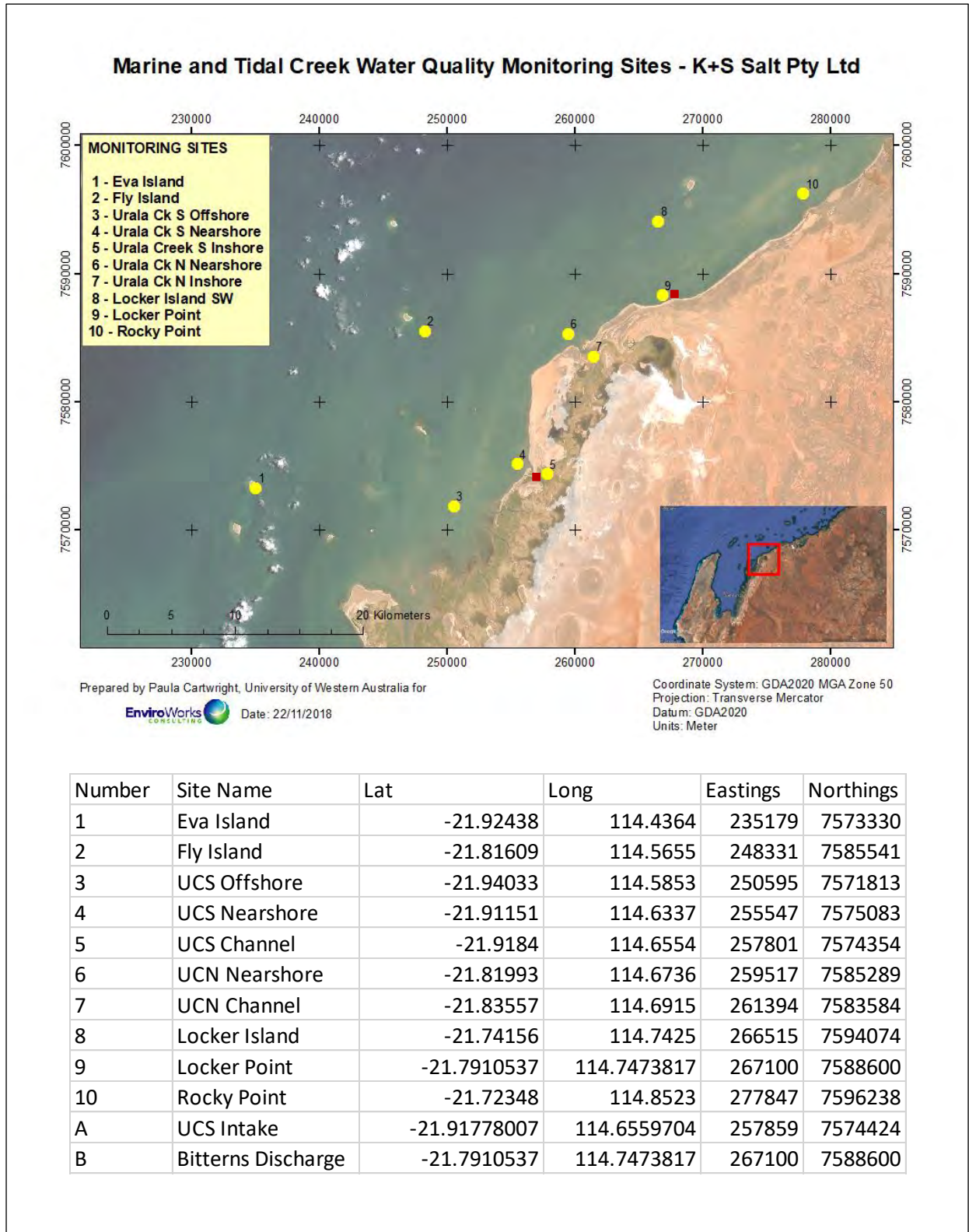


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Table 1: Water quality sampling parameters for laboratory and in-situ analysis at ten sites across the inshore, near shore and off shore regions of the Urala coastline, south west Pilbara. Note: Dissolved oxygen is only being analysed/recorded as field data and is not included in this table.

ANALYTE	SAMPLING INTERVAL		
	Months 1-6	Months 7-12	Months 13-18
Physical and Chemical Stressors			
<i>In-Situ Verification</i>			
pH	Monthly	Monthly	Monthly
Electrical Conductivity	all sites	5 sites 2 x depths	5 sites 2 x depths
Turbidity	all depths		
Total Dissolved Solids (TDS)	both laboratory and	5 sites 1 x depth	5 sites 1 x depth
Total Suspended Solids (TSS)	in-situ analysis		
Chlorophyll-a	where possible		
<i>Laboratory Parameters</i>			
Total Nitrogen (includes TN, TKN, NOx-N)		all samples verified	only sites without in-situ verification
Nitrate-N		by laboratory and in-situ analysis where possible	to be laboratory analysed
Nitrite-N			
Ammonia-N			
Reactive Phosphorus			
Total Phosphorus			
Total Organic Carbon			
Metal and Metalloid Toxicants and Selenium			
Total - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	Monthly	Monthly (TBA)	Monthly (TBA)
Dissolved - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	all depths	5 sites x 2 depths	5 sites x 2 depths
Hydrocarbons		5 sites x 1 depth	5 sites x 1 depth
Organotins - TBT			
Polycyclic Aromatic Hydrocarbons (PAH) - Standard	laboratory analysis	laboratory analysis	laboratory analysis
Benzene Toluene Ethyl Benzene Xylenes (BTEX)			
Other Parameters			
BOD			
Dissolved Organic Carbon - as an indicator of CDOM			

4. March 2019 Water Quality Sampling

Overview

The work was undertaken on the 12th – 15th March 2019, by Paula Cartwright. The field work required two days on a vessel out of Exmouth, for which the services of TerraFirma Offshore Commercial Marine were used. On day one sites 2, 6, 7, 8, 9, and 10 were sampled

and loggers were retrieved from Locker Point and Urala Creek South. The loggers were cleaned, and data downloaded that evening. On day two sites 1, 3, 4, and 5 were sampled and loggers redeployed at the same sites.

Water Sampling

There was an issue with the niskin bottle on day 2 of the field work. The rigging on the bottle snapped as it was being loaded prior to deployment. The rigging snapped into multiple pieces and was unable to be repaired on the vessel. Water sampling had already been conducted for eight of the ten sites. For the remaining two sites, only the top water was able to be collected. These sites were Urala Creek South Nearshore and Urala Creek South Inshore. It should be noted that both these sites are very shallow (<2.5 m) and the analysis of both top and bottom waters are unlikely to yield different results.

On return to Exmouth, the distributor of the niskin bottle, IMBROS Tasmania, were contacted by phone and email and discussions regarding repair are ongoing at this stage. As this bottle is specifically made for the inclusion of metals analysis (it has no metal parts inside) finding a replacement before the next field trip will not be straightforward.

Loggers

The loggers had been deployed in February as follows:

Urala Creek South –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x Hobo conductivity logger
- 1 x Turbidity logger

Locker Point –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x Hobo conductivity logger

The loggers all returned sound data although it's possible that some fouling on the hobo logger at Locker Point reduced the salinity readings gradually toward the end of the months deployment. The turbidity logger's wiper blade was effective and there was no fouling on the sensor.

The Hobo logger data is read with HOBOPRO software downloaded from <https://www.onsetcomp.com/hoboware-free-download> .

RBR data requires Ruskin software, download from: <https://rbr-global.com/products/software>
This software may require the serial number of one of the instruments to install. The serial numbers are the file numbers eg. 124245 and 124246.

Turbidity data is a text file which can be opened in any editor. File output format information is on page 10 of the accompanying manual. All logger data is available in the K+S Dropbox file.

RBRsolo loggers and Hobo conductivity loggers were re-deployed at Urala Creek South and Locker Point. The single turbidity logger was returned to place of hire, Marine In-situ Optics at Bibra Lake.

Tidal Period

Five days after spring tides, just prior to neap. It should be noted that the high tide height was over 2.1 m, which is higher than average high tides for this tidal phase and it was noted that there was more water in Urala Creeks than on any of the previous sampling occasions.

Table 2: Tides at Y Island over the February 2019 water sampling period.

12	0152	1.87
	0740	0.39
TU	1355	2.12
	2021	0.39
13	0226	1.76
	0807	0.51
WE	1427	2.10
	2104	0.48

In-situ Results

In-situ sampling was undertaken using a vertical profiling method opposed to a top and bottom logging. The sonde was set to

continuous mode, with data logging at one second intervals, and the instrument was slowly lowered from the surface to bottom waters. This has provided up to 90 data points per site, dependent on the depth. Raw data available in [K+S Dropbox>>Raw Data file>>In-Situ Water Quality](#).

Laboratory Results

The ARL analysis results are posted as soon as they are received. See [K+S Dropbox >> Raw Data file](#).

Marine Fauna

It was requested by AECOM that any marine fauna sighted could be reported. There have been many sightings throughout the field trips (particularly fish and turtles across all locations), with the most significant marine fauna sightings at the following sites-

Urala Creek South Inshore:

- Shark (possibly Lemon shark ~ 2 m length)
- Juvenile sharks (at least 5 sighted ~ 0.5 – 0.8 m length)
- Sting rays
- Turtles (>5)
- Dolphins (mother and calf) at mouth of creek
- Mud Crabs (large numbers)

Urala Creek South Offshore

- Dugong
- Dugong faeces (on a separate occasion)

Fly Island

- Large pod of dolphins (>5)

Additionally, Gndaroo Island (near Urala Creek South Offshore) appears to be a pelican roosting site, currently with a large population of birds nesting and congregating on the beach.

5. Quality Control

Laboratory Samples

Water samples collected in the field requiring transport to laboratory for analysis were conducted in accordance with the standards outlined by ANZECC and the Government of Western Australia Department of Water's field sampling guidelines. Items were filtered, refrigerated or frozen as required and reached the laboratory within 24-54 hours of collection at sea.

Two replicates samples were taken and called Tent Island (Top) and Tent Island (Bottom). These samples were taken from Urala Creek South Inshore (Top) and Urala Creek South Nearshore (Top) respectively. A dummy site was also created using Exmouth tap water. This was named Locker SW.

6. Budget

The budget is presented in Table 3. There were no excess costs above the usual monthly expenses.

Table 3: The actual expenses incurred undertaking the water quality sampling in March 2019 and the budgeted field costs.

Budget February	Actual Cost	Budgeted Cost
Field Trip		
Vessel Hire x 2 days Including 1 x crew	\$5,397.73	4000.00 0
Accommodation	Included in above	450.00
Airport bus (Learmonth) and taxi fare (Perth)	75.00	0
Airfares	906.04	800.00

Freight (airport excess)	Included in airfare	350.00
Misc.	63.71	0
Hardware	10.75	405.00
Dropbox for data sharing	15.39	0
Field Trip Total	6468.72	6245.00

7. April Field Trip

The April field trip is planned for the first week of April (2nd – 5th) so as to avoid the school holiday and Easter periods.

Marine and Tidal Creek Water Quality Monitoring Project – April 2019

1. Introduction

This report was prepared for EnviroWorks Consulting by Paula Cartwright, University of Western Australia. The purpose of this report is to provide a monthly update of water quality data in accordance with the requirements under the contractual agreement between the University of Western Australia and K+S Salt.

2. Objectives

Assess spatial and temporal variability of key water quality parameters over an 18-month period within the Exmouth Gulf. Specific objectives of the monitoring program are

- 1) To characterise baseline water quality conditions
- 2) To account for seasonal variations in water quality
- 3) To assess water quality variability between locations, top and bottom waters, spring and neap tides
- 4) To collect additional data on wave, currents, temperature and salinity to validate hydrodynamic models

3. Monthly Monitoring Requirements

The monthly water quality sampling requirements are

- Water quality sampling to take place at ten pre-determined sites along the Urala creek coastline (Figure 1) as well as 2 duplicates and a blank.
- Samples of surface and bottom waters collected and analysed in a laboratory for the parameters listed in Table 1. The parameters for laboratory analysis have been increased since the November sampling to include toxicants each month (previously each season). The bottling needs for laboratory analysis of these parameters consist of the following for each depth at each site:
 - 2 x 1 litre glass bottle
 - 1 x 500 mL polycarbonate bottle
 - 2 x 250 mL plastic bottle
 - 4 x 125 mL plastic bottle
 - 4 x 40 mL glass vial
- This makes a total of 300 bottles (from 2 depths at 10 sites, plus 3 QA sites) and requires 5/6 x 35 L eskies to carry.
- In-situ measurements of water quality performed with a multiple parameter Sonde deployed from the boat for dip and read measurements (total dissolved sediments, turbidity, salinity, pH, dissolved oxygen, chlorophyll a and temperature) encompassing a full vertical profiling at each site.

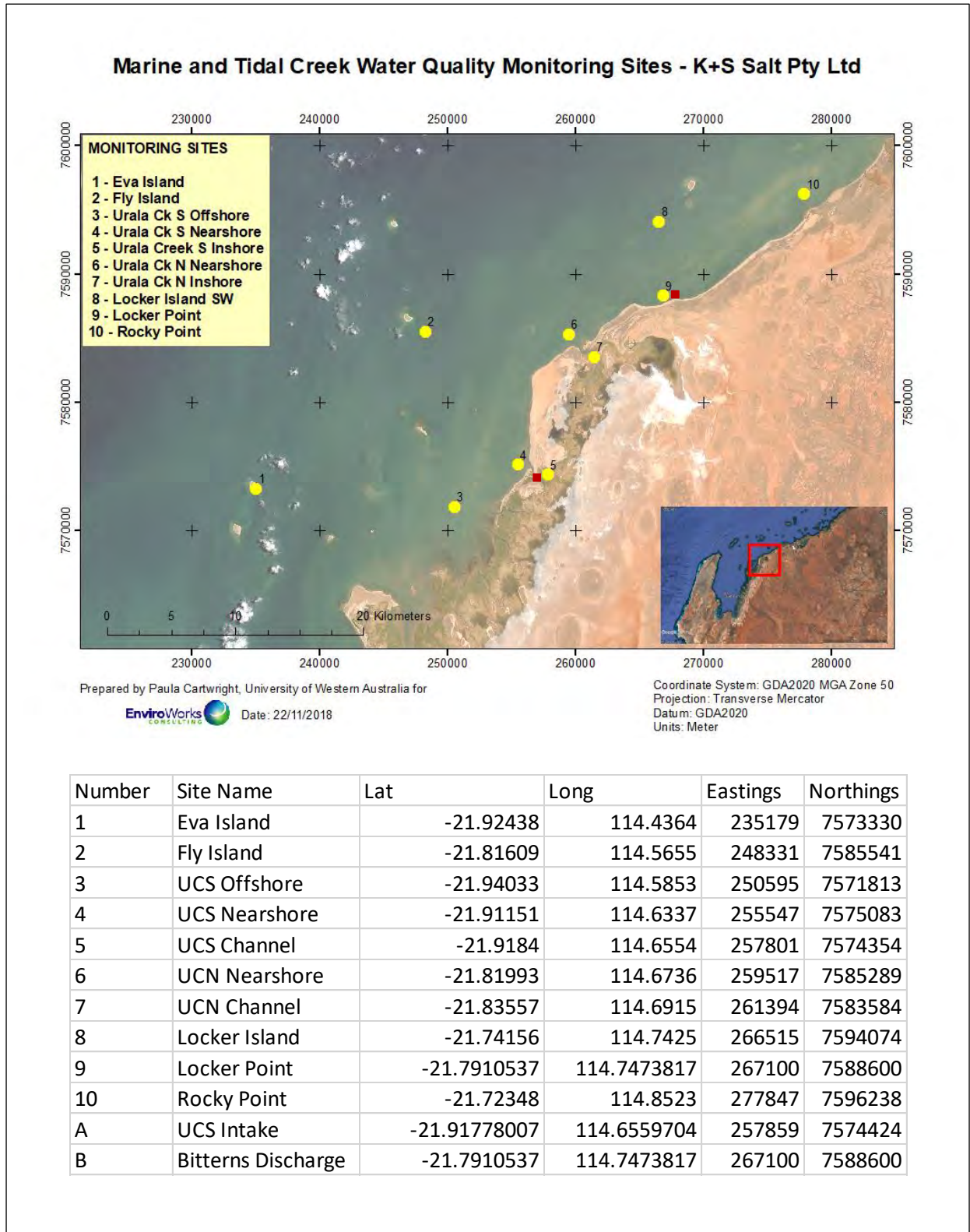


Figure 1: Map and spatial data for ten water collection sites (1-10) and two logger deployment sites (A, B) along the inshore, near shore and offshore sections of the Urala coast, south-west Pilbara. Note: The Urala Creek South and Urala Creek North inshore sites are also known as UCS and UCN Channels.

Table 1: Water quality sampling parameters for laboratory and in-situ analysis at ten sites across the inshore, near shore and off shore regions of the Urala coastline, south west Pilbara. Note: Dissolved oxygen is only being analysed/recorded as field data and is not included in this table.

ANALYTE	SAMPLING INTERVAL		
	Months 1-6	Months 7-12	Months 13-18
Physical and Chemical Stressors			
<i>In-Situ Verification</i>			
pH	Monthly	Monthly	Monthly
Electrical Conductivity	all sites	5 sites 2 x depths	5 sites 2 x depths
Turbidity	all depths		
Total Dissolved Solids (TDS)	both laboratory and	5 sites 1 x depth	5 sites 1 x depth
Total Suspended Solids (TSS)	in-situ analysis		
Chlorophyll-a	where possible		
<i>Laboratory Parameters</i>			
Total Nitrogen (includes TN, TKN, NOx-N)		all samples verified	only sites without in-situ verification to be laboratory analysed
Nitrate-N		by laboratory and in-situ analysis where possible	
Nitrite-N			
Ammonia-N			
Reactive Phosphorus			
Total Phosphorus			
Total Organic Carbon			
Metal and Metalloid Toxicants and Selenium			
Total - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	Monthly	Monthly (TBA)	Monthly (TBA)
Dissolved - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	all depths	5 sites x 2 depths	5 sites x 2 depths
Hydrocarbons		5 sites x 1 depth	5 sites x 1 depth
Organotins - TBT			
Polycyclic Aromatic Hydrocarbons (PAH) - Standard	laboratory analysis	laboratory analysis	laboratory analysis
Benzene Toluene Ethyl Benzene Xylenes (BTEX)			
Other Parameters			
BOD			
Dissolved Organic Carbon - as an indicator of CDOM			

4. March 2019 Water Quality Sampling

Overview

The work was undertaken on the 1st – 4th April 2019, by Paula Cartwright. The field work required two days on a vessel out of Exmouth, for which the services of TerraFirma Offshore Commercial Marine were used. On day one sites 2, 6, 7, 8, 9, and 10 were sampled

and loggers were retrieved from Locker Point and Urala Creek South. The loggers were cleaned, and data downloaded that evening. On day two sites 1, 3, 4, and 5 were sampled and loggers redeployed at the same sites (Urala Creek South Channel and Locker Point).

A cyclone had been through the region the previous week. There was lots of debris in the water. Urala Creek South was highly turbid and had altered sandbank formations particularly on the north east bank near the entrance. Coral spawn was prevalent throughout the gulf.

Water Sampling

Water sampling was conducted with a 5-litre niskin bottle which was loaned from IMBROS while they repair the 8-litre bottle that broke during last months sampling. As this bottle is not specifically made for the inclusion of metals analysis (it has some outer metal parts) it will be necessary to take this into account when reviewing the laboratory analysis. However, as there were no visible inner metal parts it was considered unlikely to affect the analysis.

Water sampling for the next six months will now be reduced to one depth at 5 of the 10 sites as per table 1. Unless otherwise advised, these sites will be Urala Creek South channel, inshore and offshore, and Urala Creek North channel and nearshore. All these sites are shallow (<2.5 m) and are unlikely to differ greatly between top and bottom waters.

Additionally, there is a need to reassess the frequency of the metals, hydrocarbons and ‘other parameters’ analysis and if this can be reduced to every 2nd or 3rd month from here in.

Loggers

The loggers had been deployed in March as follows:

Urala Creek South –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x Hobo conductivity logger

Locker Point –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x Hobo conductivity logger

The data from the Hobo logger at Urala Creek South does not appear normal and may have been subjected to fouling early in the deployment. The instrument was thoroughly cleaned before redeployment. The data from Locker Point appears normal. Both loggers were re-deployed at the same sites at Urala Creek South and Locker Point. Advice is needed from Water Technology as to future deployment locations for the loggers.

Logger data is available on the Dropbox folder. The Hobo logger data is read with HOBOPRO software downloaded from <https://www.onsetcomp.com/hoboware-free-download>. RBR data requires Ruskin software, download from: <https://rbr-global.com/products/software>. This software may require the serial number of one of the instruments to install. The serial numbers are the file numbers eg. 124245 and 124246.

Tidal Period

Four days after neap tides, just prior to spring.

Table 2: Tides at Y Island over the April 2019 water sampling period.

2	0336	0.65
	1001	1.53
	TU 1546	0.86
	2147	1.63
3	0413	0.53
	1029	1.67
	WE 1621	0.69
	2228	1.75

In-situ Results

In-situ sampling was undertaken using a vertical profiling method opposed to a top and bottom logging. The sonde was set to continuous mode, with data logging at one second intervals, and the instrument was slowly lowered from the surface to bottom waters. This has provided up to 90 data points per site, dependent on the depth. Raw data available in K+S Dropbox>>Raw Data file>>In-Situ Water Quality.

Laboratory Results

The ARL analysis results are posted as soon as they are received. See K+S Dropbox >> Raw Data file.

Marine Fauna

Significant marine fauna sighted in April included a shovel nose shark (~ 1.5 m) in Urala Creek South and a dugong at Urala Creek South nearshore. This is the 3rd sighting of dugongs feeding at Urala Creek South near shore and it is clearly a seagrass grazing habitat for the mammals.

From March Report - It was requested by AECOM that any marine fauna sighted could be reported. There have been many sightings throughout the field trips (particularly fish and turtles across all locations), with the most significant marine fauna sightings at the following sites-

Urala Creek South Inshore:

- Shark (possibly Lemon shark ~ 2 m length)
- Juvenile sharks (at least 5 sighted ~ 0.5 – 0.8 m length)
- Sting rays
- Turtles (>5)
- Dolphins (mother and calf) at mouth of creek
- Mud Crabs (large numbers)

Urala Creek South Offshore

- Dugong
- Dugong faeces (on a separate occasion)

Fly Island

- Large pod of dolphins (>5)

Additionally, Gndaroo Island (near Urala Creek South Offshore) appears to be a pelican roosting site, currently with a large population of birds nesting and congregating on the beach.

5. Quality Control

Laboratory Samples

Water samples collected in the field requiring transport to laboratory for analysis were conducted in accordance with the standards outlined by ANZECC and the Government of Western Australia Department of Water's field sampling guidelines. Items were filtered, refrigerated or frozen as required and reached the laboratory within 24-54 hours of collection at sea.

Two replicates samples were taken and called Tent Island (Top) and Tent Island (Bottom). These samples were taken from Urala Creek South Channel (Top) and Eva Island (Top) respectively. A dummy site was also created using Exmouth tap water. This was named Locker SW.

6. Budget

The budget is presented in Table 3. There were no excess costs above the usual monthly expenses.

Table 3: The actual expenses incurred undertaking the water quality sampling in January 2019 and the budgeted field costs.

Budget February	Actual Cost	Budgeted Cost
Field Trip		
Vessel Hire x 2 days Including 1 x crew (needed 1 day only)	\$5,200.54	4000.00
Accommodation	Included in above	450.00
Airport bus (Learmonth) and taxi fare (Perth)	75.00	0
Airport Parking Perth	96.23	0
Airfares x 1 pax	1034.20	800.00
Freight (airport excess)	Included in airfare	350.00
Misc.	97.64	0
Hardware	16.25	405.00
Dropbox for data sharing	15.39	0
Field Trip Total	6535.25	6245.00

7. May Field Trip

The May field trip is planned for the middle of May due to vessel unavailability at the beginning of May and prior commitments after May 23. Dates are TBC.

Marine and Tidal Creek Water Quality Monitoring Project – May 2019

1. Introduction

This report was prepared for EnviroWorks Consulting by Paula Cartwright, University of Western Australia. The purpose of this report is to provide a monthly update of water quality data in accordance with the requirements under the contractual agreement between the University of Western Australia and K+S Salt.

2. Objectives

Assess spatial and temporal variability of key water quality parameters over an 18-month period within the Exmouth Gulf. Specific objectives of the monitoring program are

- 1) To characterise baseline water quality conditions
- 2) To account for seasonal variations in water quality
- 3) To assess water quality variability between locations, top and bottom waters, spring and neap tides
- 4) To collect additional data on wave, currents, temperature and salinity to validate hydrodynamic models

3. Monthly Monitoring Requirements

The monthly water quality sampling requirements are

- Water quality sampling to take place at ten pre-determined sites along the Urala creek coastline (Figure 1) as well as 2 duplicates and a blank.
- Samples of surface and bottom waters collected and analysed in a laboratory for the parameters listed in Table 1. From month 7 water will be collected from only one depth at five of the ten sites. The bottling needs for laboratory analysis of these parameters consist of the following for each depth at each site:
 - 2 x 1 litre glass bottle
 - 1 x 500 mL polycarbonate bottle
 - 2 x 250 mL plastic bottle
 - 4 x 125 mL plastic bottle
 - 4 x 40 mL glass vial
- In-situ measurements of water quality performed with a multiple parameter Sonde deployed from the boat for dip and read measurements (total dissolved sediments, turbidity, salinity, pH, dissolved oxygen, chlorophyll a and temperature) encompassing a full vertical profiling at each site (except for dissolved O₂ which is only a top and bottom reading only).

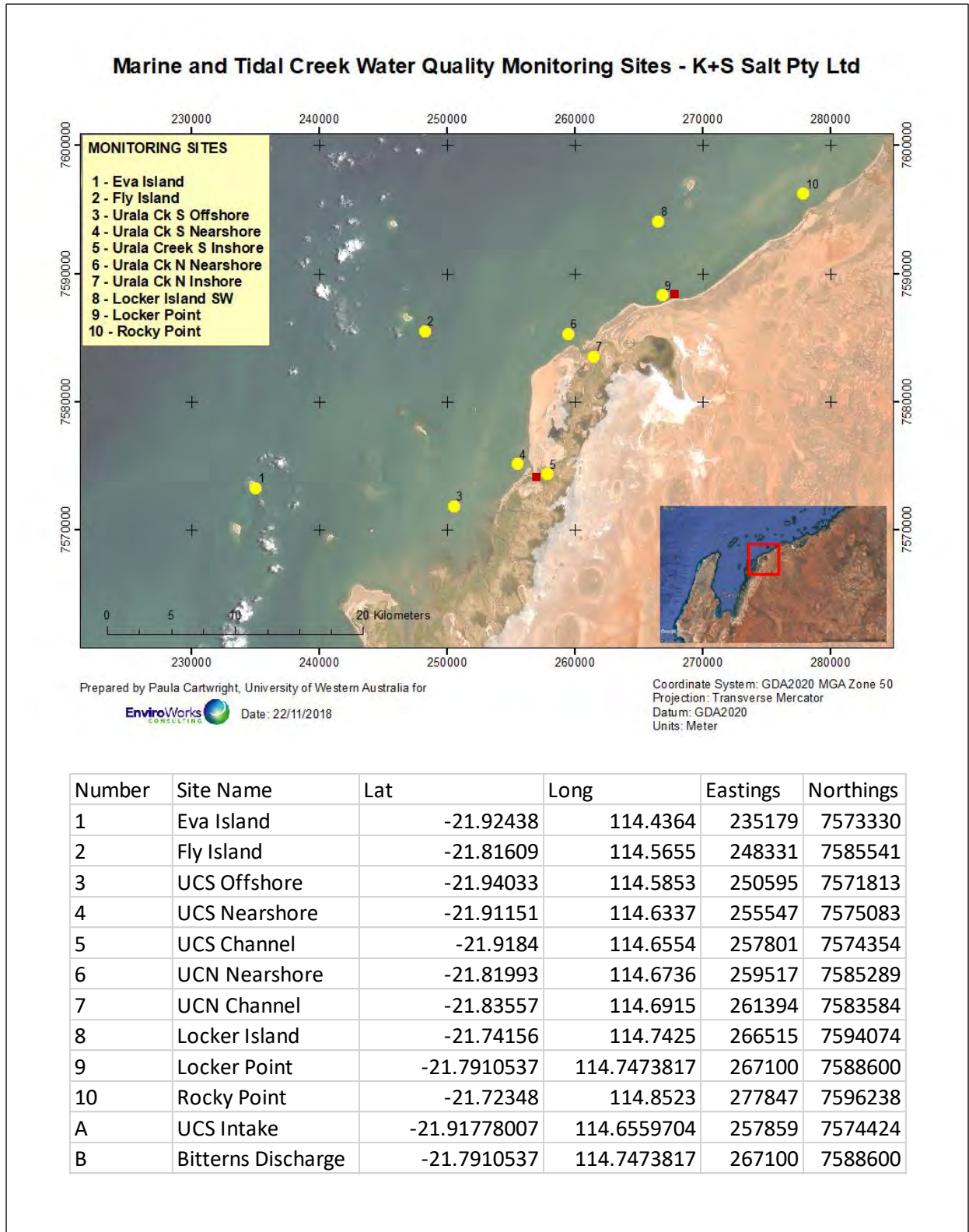


Figure 1: Map and spatial data for ten water collection sites (1-10) and two logger deployment sites (A, B) along the inshore, near shore and offshore sections of the Urala coast, south-west Pilbara. Note: The Urala Creek South and Urala Creek North inshore sites are also known as UCS and UCN Channels.

Table 1: Water quality sampling parameters for laboratory and in-situ analysis at ten sites across the inshore, near shore and off shore regions of the Urala coastline, south west Pilbara. Note: Dissolved oxygen is only being analysed/recorded as field data and is not included in this table.

ANALYTE	SAMPLING INTERVAL		
	Months 1-6	Months 7-12	Months 13-18
Physical and Chemical Stressors			
<i>In-Situ Verification</i>			
pH	Monthly	Monthly	Monthly
Electrical Conductivity	all sites	5 sites 2 x depths	5 sites 2 x depths
Turbidity	all depths		
Total Dissolved Solids (TDS)	both laboratory and	5 sites 1 x depth	5 sites 1 x depth
Total Suspended Solids (TSS)	in-situ analysis		
Chlorophyll-a	where possible		
<i>Laboratory Parameters</i>			
Total Nitrogen (includes TN, TKN, NOx-N)		all samples verified	only sites without in-situ verification
Nitrate-N		by laboratory and	to be laboratory analysed
Nitrite-N		in-situ analysis	
Ammonia-N		where possible	
Reactive Phosphorus			
Total Phosphorus			
Total Organic Carbon			
Metal and Metalloid Toxicants and Selenium			
Total - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	Monthly	Monthly (TBA)	Monthly (TBA)
Dissolved - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	all depths	5 sites x 2 depths	5 sites x 2 depths
Hydrocarbons		5 sites x 1 depth	5 sites x 1 depth
Organotins - TBT			
Polycyclic Aromatic Hydrocarbons (PAH) - Standard	laboratory analysis	laboratory analysis	laboratory analysis
Benzene Toluene Ethyl Benzene Xylenes (BTEX)			
Other Parameters			
BOD			
Dissolved Organic Carbon - as an indicator of CDOM			

4. March 2019 Water Quality Sampling

Overview

The work was undertaken on the 13th – 16th April 2019, by Paula Cartwright. The field work required two days on a vessel out of Exmouth, for which the services of TerraFirma Offshore Commercial Marine were used. On day one sites 2, 5, 6, 7, 8, 9, and 10 were

sampled and loggers were retrieved from Locker Point and Urala Creek South. The loggers were cleaned, and data downloaded that evening. On day two sites 1, 3 and 4 were sampled and loggers redeployed at the same sites (Urala Creek South Channel and Locker Point).

Water Sampling

Water sampling was conducted with the original 10-litre niskin bottle which was repaired by IMBROS after the rigging snapped during the March sampling. The bottle used for the April sampling was not specifically made for the inclusion of metals analysis (it has some metal parts) and it may have affected the analysis, specifically for monobutyl tin, which showed an anomaly in the first few samples collected in April.

Water sampling was reduced to one depth at 5 of the 10 sites as per Table 1. These sites were Urala Creek South channel, inshore and offshore, and Urala Creek North channel and nearshore. All these sites are shallow (<2.5 m) and are unlikely to differ greatly between top and bottom waters. Since undertaking this sampling, Water Technology have advised that sites to be sampled at one depth (mid) only should be Urala Creek South channel, inshore and offshore, Urala Creek North channel and Rocky Point and future sampling will follow their instruction.

Chlorophyll analysis was limited to in-situ measurements this month as this parameter requires filtering in the field and the university filtering equipment was sequestered to the RV Investigator voyage (returning mid-June). It may be worth considering whether this parameter should continue to be laboratory analysed. During the first six months of sampling there was only one month where all chlorophyll values were not below the laboratory limit of detection (this occurred during coral spawning). Whilst the sonde in-situ method often includes negative values (due to the difficulty of calibrating an optical sensor to zero) at least it provides a full range of values to show spatial and temporal variation. An improved calibration method is being investigated.

There is a need to reassess the frequency of the metals, hydrocarbons and ‘other parameters’ analysis and if this can be reduced to every 2nd or 3rd month.

Loggers

The loggers had been deployed in April as follows:

Urala Creek South –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x Hobo conductivity logger

Locker Point –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x Hobo conductivity logger

The Hobo logger from Locker Point was not functioning when it was retrieved and has been returned to OneTemp for assessment. The data from Urala Creek South Hobo logger has recovered from glitches in last months deployment but still appears to be too low compared to the readings from the sonde measurements, which have been mostly consistent with the

laboratory analysis. The logger was redeployed at Urala Creek South but will likely be returned to distributor next month following instruction since received from Water Technology.

In the initial deployment month, February, the loggers were not able to capture the highest salinity (> 55,000 uS/cm). During subsequent deployments the instruments do not appear to provide robust salinity data and alternative instruments are being investigated for this important parameter. The same type of conductivity sensor that is present on the sonde is available as a deployable instrument from Xylem (hire or purchase) and this may be the best option. Quotes have been requested.

The depth loggers were redeployed at Urala Creek South and Locker Point. They will be reconfigured to 4 hertz (instead of 1) at the next deployment as per Water Technology recommendation.

Marine Biota

Day 1: Large colonies of Sargassum around Locker Point to Rocky Point. Very turbid throughout this nearshore region.

Day 2: Very little Sargassum or turbidity – big change from previous day. There were prawns schooling in large patches (4-5 groups) near Urala Creek offshore. Fish/bait balls off Tubridgi Point with sharks feeding – also evident crossing gulf. Dugong sighted 1 nm west of Locker Point.

Tidal Period

Neap tides.

Table 2: Tides at Y Island over the May 2019 water sampling period.

14	0632	1.58
	1227	1.01
	TU 1827	1.62

15	0105	0.79
	0756	1.74
	WE 1407	0.83
	2012	1.65

In-situ Results

In-situ sampling was undertaken using a vertical profiling method opposed to a top and bottom logging. The sonde was set to continuous mode, with data logging at one second intervals, and the instrument was slowly lowered from the surface to bottom waters. This has provided up to 90 data points per site, dependent on the depth. Raw data available in K+S Dropbox>>Raw Data file>>In-Situ Water Quality.

Laboratory Results

The ARL analysis results are posted as soon as they are received. See K+S Dropbox >> Raw Data file.

5. Quality Control

Laboratory Samples

Water samples collected in the field requiring transport to laboratory for analysis were conducted in accordance with the standards outlined by ANZECC and the Government of Western Australia Department of Water's field sampling guidelines. Items were filtered, refrigerated or frozen as required and reached the laboratory within 24-54 hours of collection at sea.

Two replicates samples were taken and called Tent Island (Top) and Tent Island (Bottom). These samples were taken from Urala Creek South nearshore and Urala Creek South offshore respectively. A dummy site was also created using Exmouth tap water. This was named Locker SW. For the next months samples distilled water will be purchased for this dummy site.

6. Budget

The budget is presented in Table 3. There were no excess costs above the usual monthly expenses. This is the first month that costs have come in below budget. This was due mostly to the presence of an unpaid helper on the vessel on day 1 and the decreased number of samples, meaning lower freight cost.

Table 3: The actual expenses incurred undertaking the water quality sampling in May 2019 and the budgeted field costs.

Budget February	Actual Cost	Budgeted Cost
Field Trip		
Vessel Hire x 2 days	\$4,888.42	4000.00
Accommodation	Included in above	450.00
Airport bus (Learmonth, one way)	40.00	0
Airfares x 1 pax	1049.22	800.00
Freight (airport excess)	Included in airfare	350.00
Misc. and Hardware	190.15	405.00
Dropbox for data sharing	15.39	0
Field Trip Total	6183.88	6245.00

7. June Field Trip

The June field trip is planned for the middle of June (approx 16-20th) in order to capture spring tides required for creek profiling by Water Technology. Discussions are underway with Water Technology to determine the best way forward with logger data collection and they may accompany UWA on this next field trip.

Marine and Tidal Creek Water Quality Monitoring Project – June 2019

1. Introduction

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2. Objectives

Assess spatial and temporal variability of key water quality parameters over an 18-month period within the Exmouth Gulf. Specific objectives of the monitoring program are

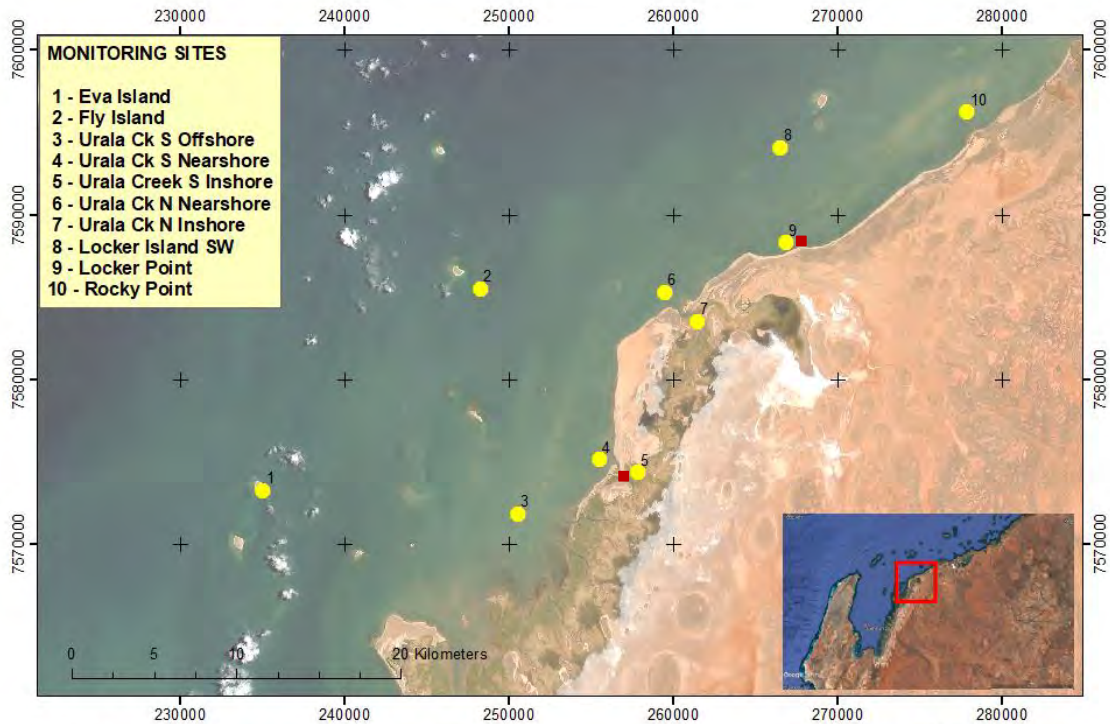
- 1) To characterise baseline water quality conditions
- 2) To account for seasonal variations in water quality
- 3) To assess water quality variability between locations, top and bottom waters, spring and neap tides
- 4) To collect additional data on wave, currents, temperature and salinity to validate hydrodynamic models

3. Monthly Monitoring Requirements

The monthly water quality sampling requirements are

- Water quality sampling to take place at ten pre-determined sites along the Urala creek coastline (Figure 1) as well as 2 duplicates and a blank.
- Samples of surface and bottom waters collected and analysed in a laboratory for the parameters listed in Table 1. From month 7 water will be collected from only one depth at five of the ten sites. The bottling needs for laboratory analysis of these parameters consist of the following for each depth at each site:
 - 2 x 1 litre glass bottle
 - 1 x 500 mL polycarbonate bottle
 - 2 x 250 mL plastic bottle
 - 4 x 125 mL plastic bottle
 - 4 x 40 mL glass vial
- In-situ measurements of water quality performed with a multiple parameter Sonde deployed from the boat for dip and read measurements (total dissolved sediments, turbidity, salinity, pH, dissolved oxygen, chlorophyll a and temperature) encompassing a full vertical profiling at each site (except for dissolved O₂ which is only a top and bottom reading only).

Marine and Tidal Creek Water Quality Monitoring Sites - K+S Salt Pty Ltd



Prepared by Paula Cartwright, University of Western Australia for

 Date: 22/11/2018

Coordinate System: GDA2020 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA2020
Units: Meter

Number	Site Name	Lat	Long	Eastings	Northings
1	Eva Island	-21.92438	114.4364	235179	7573330
2	Fly Island	-21.81609	114.5655	248331	7585541
3	UCS Offshore	-21.94033	114.5853	250595	7571813
4	UCS Nearshore	-21.91151	114.6337	255547	7575083
5	UCS Channel	-21.9184	114.6554	257801	7574354
6	UCN Nearshore	-21.81993	114.6736	259517	7585289
7	UCN Channel	-21.83557	114.6915	261394	7583584
8	Locker Island	-21.74156	114.7425	266515	7594074
9	Locker Point	-21.7910537	114.7473817	267100	7588600
10	Rocky Point	-21.72348	114.8523	277847	7596238
A	UCS Intake	-21.91778007	114.6559704	257859	7574424
B	Bitterns Discharge	-21.7910537	114.7473817	267100	7588600

Figure 1: Map and spatial data for ten water collection sites (1-10) and two logger deployment sites (A, B) along the inshore, near shore and offshore sections of the Urala coast, south-west Pilbara. Note: The Urala Creek South and Urala Creek North inshore sites are also known as UCS and UCN Channels.

Table 1: Water quality sampling parameters for laboratory and in-situ analysis at ten sites across the inshore, near shore and off shore regions of the Urala coastline, south west Pilbara. Note: Dissolved oxygen is only being analysed/recorded as field data and is not included in this table.

ANALYTE	SAMPLING INTERVAL		
	Months 1-6	Months 7-12	Months 13-18
Physical and Chemical Stressors			
<i>In-Situ Verification</i>			
pH	Monthly	Monthly	Monthly
Electrical Conductivity	all sites	5 sites 2 x depths	5 sites 2 x depths
Turbidity	all depths		
Total Dissolved Solids (TDS)	both laboratory and	5 sites 1 x depth	5 sites 1 x depth
Total Suspended Solids (TSS)	in-situ analysis		
Chlorophyll-a	where possible		
<i>Laboratory Parameters</i>			
Total Nitrogen (includes TN, TKN, NOx-N)		all samples verified	only sites without in-situ verification
Nitrate-N		by laboratory and in-situ analysis where possible	to be laboratory analysed
Nitrite-N			
Ammonia-N			
Reactive Phosphorus			
Total Phosphorus			
Total Organic Carbon			
Metal and Metalloid Toxicants and Selenium			
Total - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	Monthly	Monthly (TBA)	Monthly (TBA)
Dissolved - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	all depths	5 sites x 2 depths	5 sites x 2 depths
Hydrocarbons		5 sites x 1 depth	5 sites x 1 depth
Organotins - TBT			
Polycyclic Aromatic Hydrocarbons (PAH) - Standard	laboratory analysis	laboratory analysis	laboratory analysis
Benzene Toluene Ethyl Benzene Xylenes (BTEX)			
Other Parameters			
BOD			
Dissolved Organic Carbon - as an indicator of CDOM			

4. June 2019 Water Quality Sampling

Overview

The work was undertaken on the 28th June – 1st July 2019, by Paula Cartwright. The field work required two days on a vessel out of Exmouth, for which the services of TerraFirma Offshore Commercial Marine were used. There were rough conditions (20 knot winds) on the

morning of the first sampling day so the work was undertaken from late morning. Sites 2, 8 and 9 were sampled and loggers were retrieved from Locker Point and Urala Creek South. The loggers were cleaned, and data downloaded that evening. On day two conditions were better and sites 1, 3, 4, 5, 6, 7 and 10 were sampled and loggers (including two new CTD's and a turbidity logger) were deployed at the same sites (Urala Creek South Channel and Locker Point; see under logger heading below for more details).

Water Sampling

Water collection was conducted with an 8-litre niskin bottle specifically designed to allow for metals analysis. Sampling design is as per Table 1 (Months 7-12) where 5 sites are sampled at one depth and five sites at two depths. The sites sampled at one depth only were Urala Creek South channel, inshore and offshore, Urala Creek North channel and Rocky Point.

Chlorophyll analysis was conducted by both water collection and in-situ measurements (as opposed to only in-situ measurements in May when the filter pump was not available). It may be worth considering whether this parameter should continue to be laboratory analysed. During the first six months of sampling there was only one month where all chlorophyll values were not below the laboratory limit of detection (this occurred during coral spawning). Whilst the sonde in-situ method often includes negative values (due to the difficulty of calibrating an optical sensor to zero) at least it provides a full range of values to show spatial and temporal variation. An improved calibration method is being investigated.

As with chlorophyll, there remains a need to reassess the frequency of the metals, hydrocarbons and 'other parameters' analysis and if this can be reduced to every 2nd or 3rd month.

Loggers

The loggers had been deployed in May as follows:

Urala Creek South –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x Hobo conductivity logger

Locker Point –

- 1 x RBR*solo*³ D | Depth Logger

The remaining Hobo logger deployed at Urala Creek South was not functioning when data retrieval was attempted. This had occurred with the other Hobo logger the previous month which was returned to OneTemp for assessment. These units have not given reliable data or lasted for more than a few months deployment and together with advice from Water Technology, it was decided to replace them with higher quality CTD's from In-Situ Marine Optics.

The new CTD's were deployed at Urala Creek South and Locker Point along with the RBR depth/wave loggers which were reconfigured as per Water Technologies detailed instructions. A single turbidity logger was also deployed at Locker Point. The next sampling trip will be

undertaken in two weeks to allow for early detection of any required adjustments to the CTD deployments.

Marine Biota

Not much to report. Very high turbidity in most parts of the sampling region. A dugong sighted offshore from Tubridgi Point. Several Great Egret (Great White Heron) in Urala Creek South, along with the usual birds of prey, oyster catchers.

Tidal Period

Neap tides.

Table 2: Tides at Y Island over the June 2019 water sampling period.

29	0040	0.87
	0732	1.77
	SA 1433	0.69
	2044	1.36
30	0152	0.90
	0826	1.91
	SU 1528	0.52
	2150	1.48

In-situ Results

In-situ sampling was undertaken using a vertical profiling method opposed to a top and bottom logging. The sonde was set to continuous mode, with data logging at one second intervals, and the instrument was slowly lowered from the surface to bottom waters. This has provided up to 90 data points per site, dependent on the depth. Raw data available in K+S Dropbox>>Raw Data file>>In-Situ Water Quality.

Laboratory Results

The ARL analysis results are posted as soon as they are received. See K+S Dropbox >> Raw Data file.

5. Quality Control

Laboratory Samples

Water samples collected in the field requiring transport to laboratory for analysis were conducted in accordance with the standards outlined by ANZECC and the Government of Western Australia Department of Water's field sampling guidelines. Items were filtered, refrigerated or frozen as required and reached the laboratory within 24-54 hours of collection at sea.

One replicate sample was taken at Rocky Point and called Tent Island. A dummy site was also created using distilled water. This was named Locker SW.

6. Budget

The budget is presented in Table 3. There were no excess costs above the usual monthly expenses.

Table 3: The actual expenses incurred undertaking the water quality sampling in May 2019 and the budgeted field costs.

Budget February	Actual Cost	Budgeted Cost
Field Trip		
Vessel Hire x 2 days inc. crew services	\$5,476.82	4000.00
Accommodation	Included in above	450.00
Airport bus (Learmonth, two way)	75.00	0
Airfares x 1 pax	1117.66	800.00
Freight (airport excess)	Included in airfare	350.00
Misc. and Hardware	118.57	405.00
Dropbox for data sharing	15.39	0
Field Trip Total	6803.57	6245.00

7. July Field Trip

The July field trip is planned for the middle of July (approx 15-19th), just over two weeks away. The short duration between trips is to enable early checking on the CTD deployments in case adjustments need to be made.

Marine and Tidal Creek Water Quality Monitoring Project – July 2019

1. Introduction

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2. Objectives

Assess spatial and temporal variability of key water quality parameters over an 18-month period within the Exmouth Gulf. Specific objectives of the monitoring program are

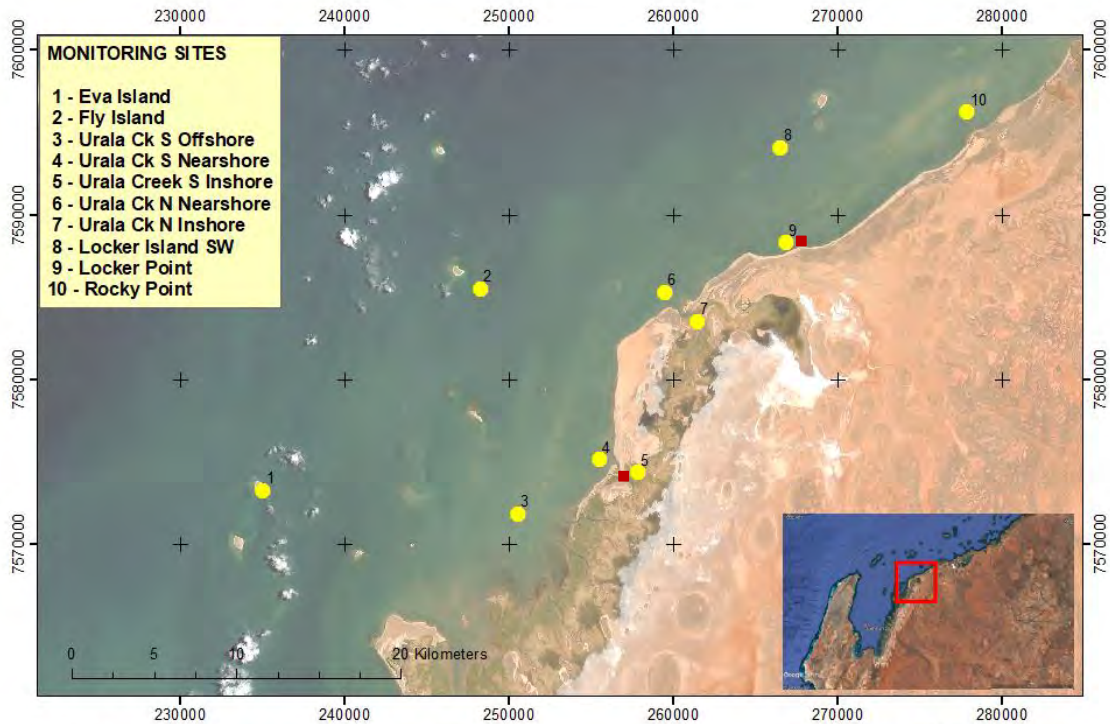
- 1) To characterise baseline water quality conditions
- 2) To account for seasonal variations in water quality
- 3) To assess water quality variability between locations, top and bottom waters, spring and neap tides
- 4) To collect additional data on wave, currents, temperature and salinity to validate hydrodynamic models

3. Monthly Monitoring Requirements

The monthly water quality sampling requirements are

- Water quality sampling to take place at ten pre-determined sites along the Urala creek coastline (Figure 1) as well as 2 duplicates and a blank.
- Samples of surface and bottom waters collected and analysed in a laboratory for the parameters listed in Table 1. From month 7 water will be collected from only one depth at five of the ten sites. The bottling needs for laboratory analysis of these parameters consist of the following for each depth at each site:
 - 2 x 1 litre glass bottle
 - 1 x 500 mL polycarbonate bottle
 - 2 x 250 mL plastic bottle
 - 4 x 125 mL plastic bottle
 - 4 x 40 mL glass vial
- In-situ measurements of water quality performed with a multiple parameter Sonde deployed from the boat for dip and read measurements (total dissolved sediments, turbidity, salinity, pH, dissolved oxygen, chlorophyll a and temperature) encompassing a full vertical profiling at each site (except for dissolved O₂ which is only a top and bottom reading only).

Marine and Tidal Creek Water Quality Monitoring Sites - K+S Salt Pty Ltd



Prepared by Paula Cartwright, University of Western Australia for

EnviroWorks Date: 22/11/2018

Coordinate System: GDA2020 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA2020
Units: Meter

Number	Site Name	Lat	Long	Eastings	Northings
1	Eva Island	-21.92438	114.4364	235179	7573330
2	Fly Island	-21.81609	114.5655	248331	7585541
3	UCS Offshore	-21.94033	114.5853	250595	7571813
4	UCS Nearshore	-21.91151	114.6337	255547	7575083
5	UCS Channel	-21.9184	114.6554	257801	7574354
6	UCN Nearshore	-21.81993	114.6736	259517	7585289
7	UCN Channel	-21.83557	114.6915	261394	7583584
8	Locker Island	-21.74156	114.7425	266515	7594074
9	Locker Point	-21.7910537	114.7473817	267100	7588600
10	Rocky Point	-21.72348	114.8523	277847	7596238
A	UCS Intake	-21.91778007	114.6559704	257859	7574424
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Figure 1: Map and spatial data for ten water collection sites (1-10) and two logger deployment sites (A, B) along the inshore, near shore and offshore sections of the Urala coast, south-west Pilbara. Note: The Urala Creek South and Urala Creek North inshore sites are also known as UCS and UCN Channels.

Table 1: Water quality sampling parameters for laboratory and in-situ analysis at ten sites across the inshore, near shore and off shore regions of the Urala coastline, south west Pilbara. Note: Dissolved oxygen is only being analysed/recorded as field data and is not included in this table.

ANALYTE	SAMPLING INTERVAL		
	Months 1-6	Months 7-12	Months 13-18
Physical and Chemical Stressors			
<i>In-Situ Verification</i>			
pH	Monthly	Monthly	Monthly
Electrical Conductivity	all sites	5 sites 2 x depths	5 sites 2 x depths
Turbidity	all depths		
Total Dissolved Solids (TDS)	both laboratory and	5 sites 1 x depth	5 sites 1 x depth
Total Suspended Solids (TSS)	in-situ analysis		
Chlorophyll-a	where possible		
<i>Laboratory Parameters</i>			
Total Nitrogen (includes TN, TKN, NOx-N)		all samples verified	only sites without in-situ verification
Nitrate-N		by laboratory and in-situ analysis where possible	to be laboratory analysed
Nitrite-N			
Ammonia-N			
Reactive Phosphorus			
Total Phosphorus			
Total Organic Carbon			
Metal and Metalloid Toxicants and Selenium			
Total - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	Monthly	Monthly (TBA)	Monthly (TBA)
Dissolved - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	all depths	5 sites x 2 depths	5 sites x 2 depths
Hydrocarbons		5 sites x 1 depth	5 sites x 1 depth
Organotins - TBT			
Polycyclic Aromatic Hydrocarbons (PAH) - Standard	laboratory analysis	laboratory analysis	laboratory analysis
Benzene Toluene Ethyl Benzene Xylenes (BTEX)			
Other Parameters			
BOD			
Dissolved Organic Carbon - as an indicator of CDOM			

4. June 2019 Water Quality Sampling

Overview

The work was undertaken on the 16th July – 17th July 2019, by Paula Cartwright. The field work required two days on a vessel out of Exmouth, for which the services of TerraFirma Offshore Commercial Marine were used. Again there were rough conditions (>15 knot

winds) on the morning of the first sampling day so the work was undertaken from late morning. Sites 1, 3, 4, 5 and 9 were sampled and loggers were retrieved from Locker Point and Urala Creek South. On day two conditions were still rough however we managed to get across the gulf very early before crossing was not possible and finish the work despite very difficult conditions throughout the entire day. Sites 2, 6, 7, 8 and 10 were sampled and loggers were re-deployed at the Urala Creek South Channel and Locker Point.

Water Sampling

Water collection was conducted with an 8-litre niskin bottle specifically designed to allow for metals analysis. Sampling design is as per Table 1 (Months 7-12) where 5 sites are sampled at one depth and five sites at two depths. The sites sampled at one depth only were Urala Creek South channel, inshore and offshore, Urala Creek North channel and Rocky Point. Two replicate samples were taken from Rocky Point and Urala Creek North Channel. These were named Tent Island top and bottom respectively.

Loggers

The loggers had been deployed at the end of June as follows:

Urala Creek South –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x CTD

Locker Point –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x CTD
- 1 x Turbidity logger

Because of the importance of the CTD data this sampling trip took place just two weeks after the initial deployment of the CTD's to allow for any deployment issues to be picked up early. The CTD's had been deployed on metal frames at both locations. Two different methods of attachment to the frames were trialled:

1. Horizontal, with the sensor jutting clear of metal parts on the frame, as metal parts adjacent to the sensor can interfere with conductivity readings.
2. Upright with sensor facing down to avoid settlement of sediments on the sensor (but closer to metal parts).

Both deployment methods had been recommended as appropriate by the manufacturers.

It was found that the horizontal method resulted in a large amount of muddy fouling along the length of the logger including on the sensor. This was reflected in the data with the salinity readings showing a clear downward trend over the two weeks. This did not occur in the data for the CTD that was deployed upright, with the data remaining stable throughout the two weeks.

The CTD's have both now been deployed in the upright position.

The next sampling trip will again be in two weeks' time (2nd August) to check that both loggers are now providing robust data throughout their deployment.

Marine Biota

Dolphins two nautical miles west of Locker Point.

Tidal Period

Spring tides.

Table 2: Tides at Y Island over the Jul 2y019 water sampling period.

16	0347	0.86
	1006	2.01
	TU 1708	0.23
	2332	1.64
17	0437	0.79
	1053	2.02
	WE 1747	0.17
○		

In-situ Results

In-situ sampling was undertaken using a vertical profiling method opposed to a top and bottom logging. The sonde was set to continuous mode, with data logging at one second intervals, and the instrument was slowly lowered from the surface to bottom waters. This has provided up to 90 data points per site, dependent on the depth. Raw data available in K+S Dropbox>>Raw Data file>>In-Situ Water Quality.

Laboratory Results

The ARL analysis results are posted as soon as they are received. See K+S Dropbox >> Raw Data file.

5. Quality Control

Laboratory Samples

Water samples collected in the field requiring transport to laboratory for analysis were conducted in accordance with the standards outlined by ANZECC and the Government of Western Australia Department of Water's field sampling guidelines. Items were filtered, refrigerated or frozen as required and reached the laboratory within 24-54 hours of collection at sea.

Two replicate sample were taken at Rocky Point and Urala Creek North Channel and named Tent Island Bottom and Tent Island Top respectively. A dummy site was also created using distilled water. This was named Locker SW.

6. Budget

The budget is presented in Table 3. There were significantly increased flight costs compared to normal likely due to the peak school holiday period.

Table 3: The actual expenses incurred undertaking the water quality sampling in July 2019 and the budgeted field costs.

Budget February	Actual Cost	Budgeted Cost
Field Trip		
Vessel Hire x 2 days inc. crew services	\$5,542.67	4000.00
Accommodation	Included in above	450.00
Airport bus (Learmonth, two way)	75.00	0
Airport Parking	133.99	0
Airfares x 1 pax	1570.48	800.00
Freight (airport excess)	Included in airfare	350.00
Misc. and Hardware	124.28	405.00
Dropbox for data sharing	18.69	0
Field Trip Total	7465.11	6245.00

7. August Field Trip

The August field trip is planned for the middle of beginning of August (2nd-5th), just two weeks away. The short duration between trips is to enable early checking on the CTD deployments in case adjustments need to be made.

Marine and Tidal Creek Water Quality Monitoring Project – August 2019

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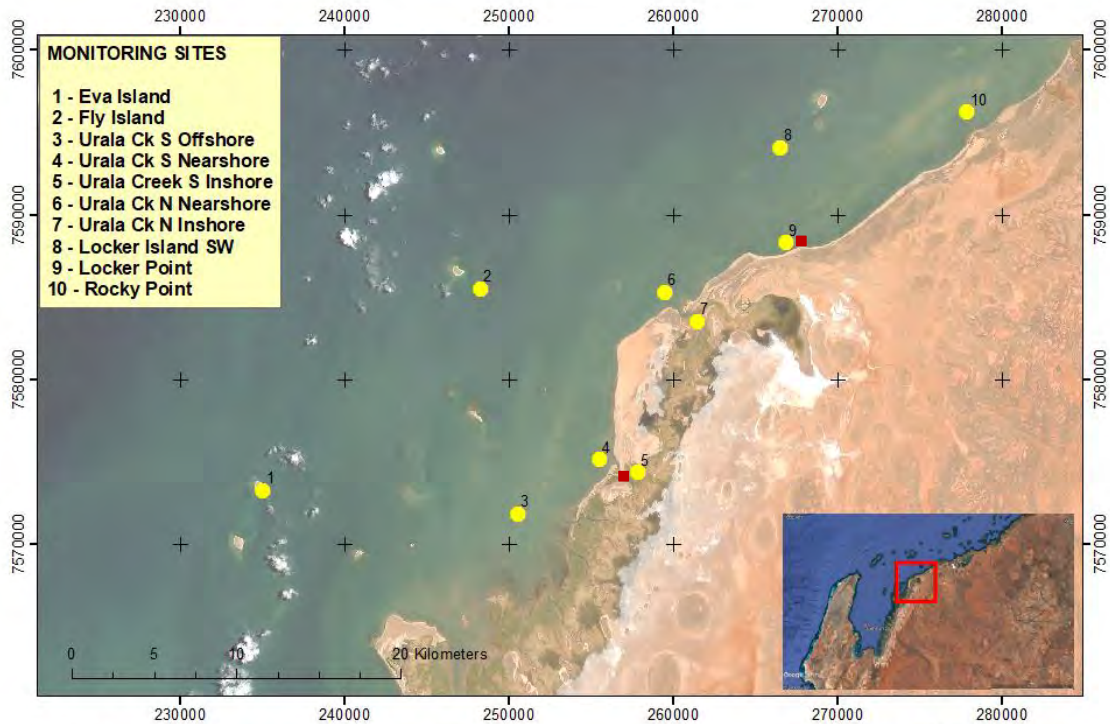
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The monthly water quality sampling requirements are

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Marine and Tidal Creek Water Quality Monitoring Sites - K+S Salt Pty Ltd



Prepared by Paula Cartwright, University of Western Australia for

EnviroWorks Date: 22/11/2018

Coordinate System: GDA2020 MGA Zone 50
Projection: Transverse Mercator
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Number	Site Name	Lat	Long	Eastings	Northings
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ANALYTE	SAMPLING INTERVAL		
	Months 1-6	Months 7-12	Months 13-18
Physical and Chemical Stressors			
<i>In-Situ Verification</i>			
pH	Monthly	Monthly	Monthly
Electrical Conductivity	all sites	5 sites 2 x depths	5 sites 2 x depths
Turbidity	all depths		
Total Dissolved Solids (TDS)	both laboratory and	5 sites 1 x depth	5 sites 1 x depth
Total Suspended Solids (TSS)	in-situ analysis		
Chlorophyll-a	where possible		
<i>Laboratory Parameters</i>			
Total Nitrogen (includes TN, TKN, NOx-N)		all samples verified	only sites without in-situ verification
Nitrate-N		by laboratory and	to be laboratory analysed
Nitrite-N		in-situ analysis	
Ammonia-N		where possible	
Reactive Phosphorus			
Total Phosphorus			
Total Organic Carbon			
Metal and Metalloid Toxicants and Selenium			
Total - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	Monthly	Monthly (TBA)	Monthly (TBA)
Dissolved - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	all depths	5 sites x 2 depths	5 sites x 2 depths
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Organotins - TBT			
Polycyclic Aromatic Hydrocarbons (PAH) - Standard	laboratory analysis	laboratory analysis	laboratory analysis
Benzene Toluene Ethyl Benzene Xylenes (BTEX)			
Other Parameters			
BOD			
Dissolved Organic Carbon - as an indicator of CDOM			

4. August 2019 Water Quality Sampling

Overview

The work was undertaken on the 2nd - 5th August 2019, by Paula Cartwright. The field work required two days on a vessel out of Exmouth, for which the services of TerraFirma Offshore Commercial Marine were used. On day one sites 2, 6, 7 and 9 were sampled and

loggers were retrieved from Locker Point and Urala Creek South. On day two sites 1, 3, 4, 5, 8 and 10 were sampled and logger re-deployed at Locker Point and Urala Creek South.

Water Sampling

Water collection was conducted with an 8-litre niskin bottle specifically designed to allow for metals analysis. Sampling design is as per Table 1 (Months 7-12) where 5 sites are sampled at one depth and five sites at two depths. The sites sampled at one depth only were Urala Creek South Channel, UCS-Nearshore, UCS-Offshore, Urala Creek North channel and Rocky Point. Two replicate samples were taken from Rocky Point and Urala Creek South-Near shore. These were named Tent Island top and bottom respectively.

Loggers

The loggers had been deployed at the end of June as follows:

Urala Creek South –

- 1 x RBRsolo³ D | Depth Logger
- 1 x CTD

Locker Point –

- 1 x RBRsolo³ D | Depth Logger
- 1 x CTD
- 1 x Turbidity logger

Because of the importance of the CTD data this sampling trip took place just two weeks after the second deployment of the CTD's to assess if repositioning the CTD in Urala Creek South fixed a previous issue caused by fouling. For the second deployment both CTD's were deployed in a horizontal position on metal frames at both locations. The data returned was robust, with fluctuations in salinity up to 70,000 μ s remaining throughout the entire deployment.

Marine Biota

Whales breaching throughout the gulf and as far east as Locker Island.

Tidal Period

Spring tides.

Table 2: Tides at Y Island over the August 2019 water sampling period.

3	0029	1.94
	0550	0.60
	SA 1207	2.29
	1844	0.12
4	0102	2.01
	0635	0.53
	SU 1249	2.25
	1916	0.15

In-situ Results

In-situ sampling was undertaken using a vertical profiling method opposed to a top and bottom logging. The sonde was set to continuous mode, with data logging at one second

intervals, and the instrument was slowly lowered from the surface to bottom waters. This has provided up to 90 data points per site, dependent on the depth. Raw data available in K+S Dropbox>>Raw Data file>>In-Situ Water Quality.

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Laboratory Samples

Water samples collected in the field requiring transport to laboratory for analysis were conducted in accordance with the standards outlined by ANZECC and the Government of Western Australia Department of Water's field sampling guidelines. Items were filtered, refrigerated or frozen as required and reached the laboratory within 24-54 hours of collection at sea.

Two replicate sample were taken at Rocky Point and Urala Creek South Offshore and named Tent Island Top and Tent Island Bottom respectively. A dummy site was also created using distilled water. This was named Locker SW.

6. Budget

The budget is presented in Table 3. Airfares were higher than normal this trip due to school holidays.

Table 3: The actual expenses incurred undertaking the water quality sampling in May 2019 and the budgeted field costs.

Budget February	Actual Cost	Budgeted Cost
Field Trip		
Vessel Hire x 2 days inc. crew services	\$5,485.31	4000.00
Accommodation	Included in above	450.00
Airport bus (Learmonth, two way)	75.00	0
Airfares x 1 pax	1356.00	800.00
Freight (airport excess)	Included in airfare	350.00
Misc. and Hardware	93.60	405.00
Dropbox for data sharing	18.69	0
Field Trip Total	7028.60	6245.00

7. September Field Trip

The September field trip is planned for the 6th – 9th September.

Marine and Tidal Creek Water Quality Monitoring Project – September 2019

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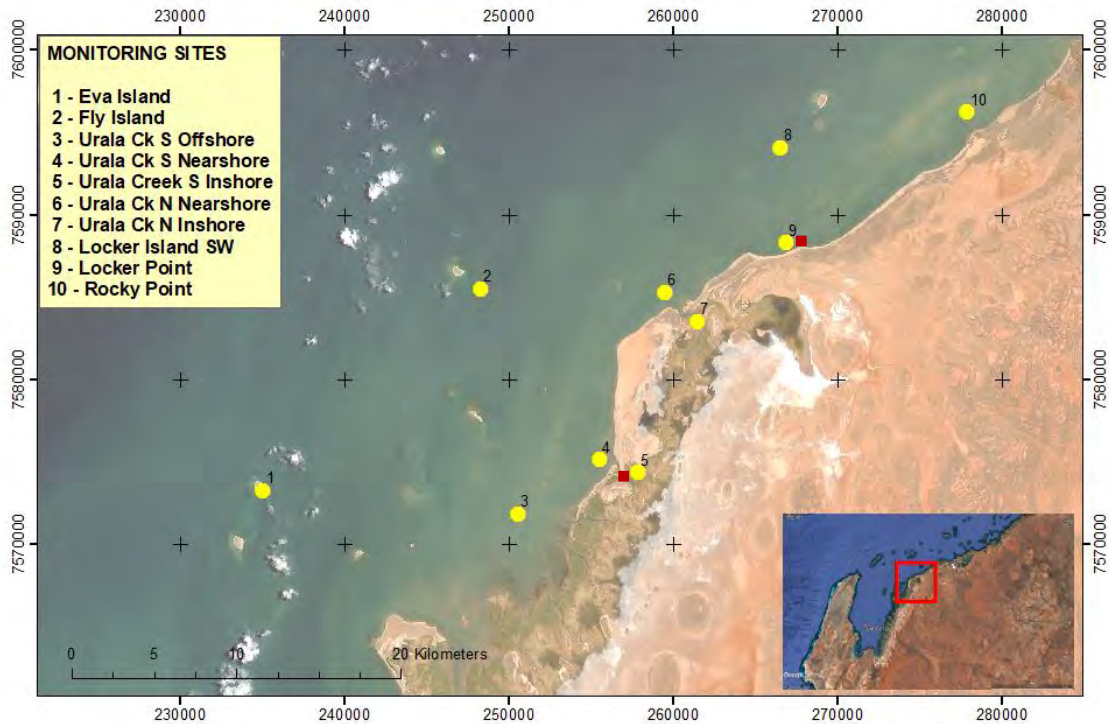
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Prepared by Paula Cartwright, University of Western Australia for

 Date: 22/11/2018

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<i>In-Situ Verification</i>			
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Electrical Conductivity	all sites	5 sites 2 x depths	5 sites 2 x depths
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Total Dissolved Solids (TDS)	both laboratory and	5 sites 1 x depth	5 sites 1 x depth
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Chlorophyll-a	where possible		
<i>Laboratory Parameters</i>			
Total Nitrogen (includes TN, TKN, NOx-N)		all samples verified	only sites without in-situ verification
Nitrate-N		by laboratory and in-situ analysis where possible	to be laboratory analysed
Nitrite-N			
Ammonia-N			
Reactive Phosphorus			
Total Phosphorus			
Total Organic Carbon			
Metal and Metalloid Toxicants and Selenium			
Total - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	Monthly	Monthly (TBA)	Monthly (TBA)
Dissolved - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	all depths	5 sites x 2 depths	5 sites x 2 depths
Hydrocarbons		5 sites x 1 depth	5 sites x 1 depth
Organotins - TBT			
Polycyclic Aromatic Hydrocarbons (PAH) - Standard	laboratory analysis	laboratory analysis	laboratory analysis
Benzene Toluene Ethyl Benzene Xylenes (BTEX)			
Other Parameters			
BOD			
Dissolved Organic Carbon - as an indicator of CDOM			

4. September 2019 Water Quality Sampling

Overview

The work was undertaken on the 6th – 9th September 2019, by Paula Cartwright. The field work required two days on a vessel out of Exmouth, for which the services of TerraFirma Offshore Commercial Marine were used. There were mechanical issues with the vessels

inboard engine overheating shortly after departure from Exmouth Marina on day one. It was necessary to return to port and perform some mechanical work before heading out again late morning.

On day one sites 2, 8 and 9 were sampled and loggers were retrieved from Locker Point and Urala Creek South. On day two sites 1, 3, 4, 5, 6, 7 and 10 were sampled and loggers re-deployed at Locker Point and Urala Creek South.

Water Sampling

Water collection was conducted with an 8-litre niskin bottle specifically designed to allow for metals analysis. Sampling design is as per Table 1 (Months 7-12) where 5 sites are sampled at one depth and five sites at two depths. The sites sampled at one depth only were Urala Creek South Channel, UCS-Nearshore, UCS-Offshore, Urala Creek North channel and Rocky Point. Two replicate samples were taken from Rocky Point and Urala Creek South-Near shore. These were named Tent Island top and bottom respectively.

Conditions were less turbid than usual along the Urala Creek North to Rocky Point coastline. Conditions were calm, particularly on day 2 (glassy entire day).

Loggers

The loggers had been deployed in August as follows:

Urala Creek South –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x CTD

Locker Point –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x CTD
- 1 x Turbidity logger

This was the first month that the loggers had been deployed for an entire four-week duration. All loggers returned sound data for the entire period of deployment with no signs of fouling affecting outcome. Data is available in the Dropbox file under logger data.

Marine Biota

The Exmouth Gulf was full of whales as far east as Locker Island. Blue swimmer crab and juvenile mud crab sighted in Urala Creek South.

Tidal Period

Neap tides.

Table 2: Tides at Y Island over the September 2019 water sampling period.

6	0235	2.12
	0915	0.45
FR	1508	1.63
●	2039	0.63
7	0310	1.99
	1005	0.58
SA	1552	1.44
	2109	0.79
8	0354	1.83
	1112	0.71
SU	1656	1.26
	2150	0.97

In-situ Results

In-situ sampling was undertaken using a vertical profiling method opposed to a top and bottom logging. The sonde was set to continuous mode, with data logging at one second intervals, and the instrument was slowly lowered from the surface to bottom waters. This has provided up to 90 data points per site, dependent on the depth. Raw data available in K+S Dropbox>>Raw Data file>>In-Situ Water Quality.

Laboratory Results

The ARL analysis results are posted as soon as they are received. See K+S Dropbox >> Raw Data file.

5. Quality Control

Laboratory Samples

Water samples collected in the field requiring transport to laboratory for analysis were conducted in accordance with the standards outlined by ANZECC and the Government of Western Australia Department of Water's field sampling guidelines. Items were filtered, refrigerated or frozen as required and reached the laboratory within 24-54 hours of collection at sea.

Two replicate sample were taken at Rocky Point and Eva Island Bottom and named Tent Island Top and Tent Island Bottom respectively. A dummy site was also created using Exmouth tap water. This was named Locker SW.

6. Budget

The budget is presented in Table 3.

Table 3: The actual expenses incurred undertaking the water quality sampling in September 2019 and the budgeted field costs.

Budget September	Actual Cost	Budgeted Cost
Field Trip		
Vessel Hire x 2 days inc. crew services	\$5,543.14	4000.00
Accommodation	Included in above	450.00
Airport Parking	96.76	0
Airport bus (Learmonth, two way)	75.00	0
Airfares x 1 pax	908.60	800.00
Freight (airport excess)	Included in airfare	350.00
Misc. and Hardware	71.37	405.00
Dropbox for data sharing	18.69	0
Field Trip Total	6713.56	6245.00

7. October Field Trip

The next field trip is planned for the 4th – 7th October.

Marine and Tidal Creek Water Quality Monitoring Project – October 2019

1. Introduction

This report was prepared for EnviroWorks Consulting by Paula Cartwright, University of Western Australia. The purpose of this report is to provide a monthly update of water quality data in accordance with the requirements under the contractual agreement between the University of Western Australia and K+S Salt.

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Assess spatial and temporal variability of key water quality parameters over an 18-month period within the Exmouth Gulf. Specific objectives of the monitoring program are

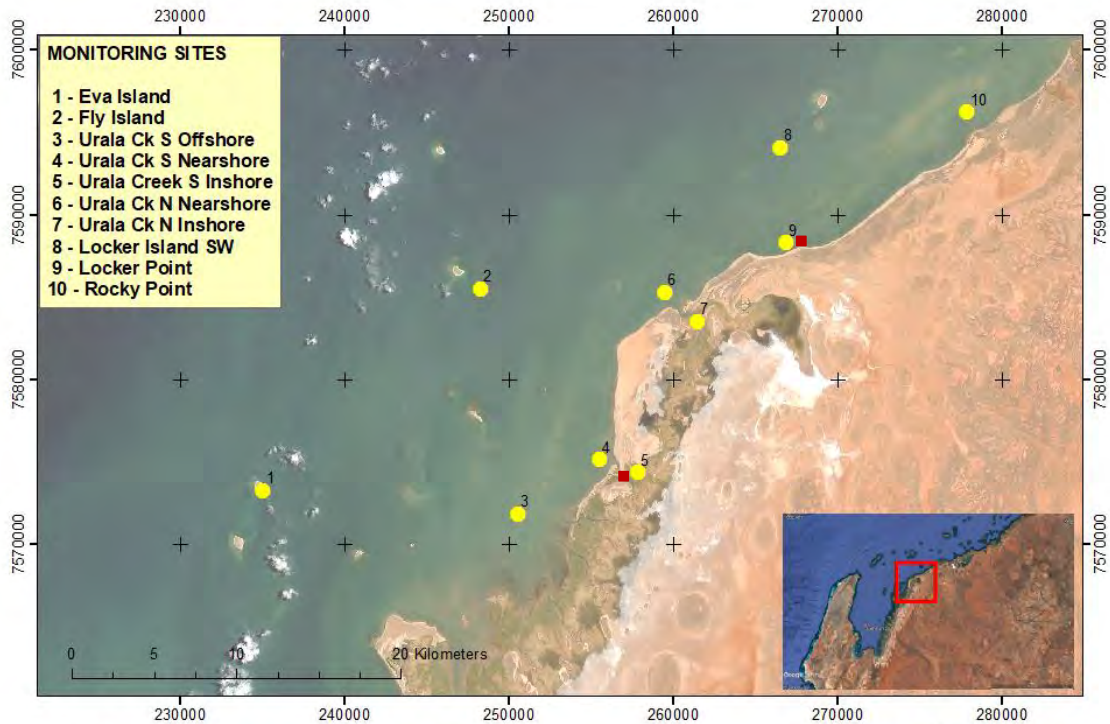
- 1) To characterise baseline water quality conditions
- 2) To account for seasonal variations in water quality
- 3) To assess water quality variability between locations, top and bottom waters, spring and neap tides
- 4) To collect additional data on wave, currents, temperature and salinity to validate hydrodynamic models

3. Monthly Monitoring Requirements

The monthly water quality sampling requirements are

- Water quality sampling to take place at ten pre-determined sites along the Urala creek coastline (Figure 1) as well as 2 duplicates and a blank.
- Samples of surface and bottom waters collected and analysed in a laboratory for the parameters listed in Table 1. From month 7 water will be collected from only one depth at five of the ten sites. The bottling needs for laboratory analysis of these parameters consist of the following for each depth at each site:
 - 2 x 1 litre glass bottle
 - 1 x 500 mL polycarbonate bottle
 - 2 x 250 mL plastic bottle
 - 4 x 125 mL plastic bottle
 - 4 x 40 mL glass vial
- In-situ measurements of water quality performed with a multiple parameter Sonde deployed from the boat for dip and read measurements (total dissolved sediments, turbidity, salinity, pH, dissolved oxygen, chlorophyll a and temperature) encompassing a full vertical profiling at each site (except for dissolved O₂ which is only a top and bottom reading only).

Marine and Tidal Creek Water Quality Monitoring Sites - K+S Salt Pty Ltd



Prepared by Paula Cartwright, University of Western Australia for

EnviroWorks Date: 22/11/2018

Coordinate System: GDA2020 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA2020
Units: Meter

Number	Site Name	Lat	Long	Eastings	Northings
1	Eva Island	-21.92438	114.4364	235179	7573330
2	Fly Island	-21.81609	114.5655	248331	7585541
3	UCS Offshore	-21.94033	114.5853	250595	7571813
4	UCS Nearshore	-21.91151	114.6337	255547	7575083
5	UCS Channel	-21.9184	114.6554	257801	7574354
6	UCN Nearshore	-21.81993	114.6736	259517	7585289
7	UCN Channel	-21.83557	114.6915	261394	7583584
8	Locker Island	-21.74156	114.7425	266515	7594074
9	Locker Point	-21.7910537	114.7473817	267100	7588600
10	Rocky Point	-21.72348	114.8523	277847	7596238
A	UCS Intake	-21.91778007	114.6559704	257859	7574424
B	Bitterns Discharge	-21.7910537	114.7473817	267100	7588600

Figure 1: Map and spatial data for ten water collection sites (1-10) and two logger deployment sites (A, B) along the inshore, near shore and offshore sections of the Urala coast, south-west Pilbara. Note: The Urala Creek South and Urala Creek North inshore sites are also known as UCS and UCN Channels.

Table 1: Water quality sampling parameters for laboratory and in-situ analysis at ten sites across the inshore, near shore and off shore regions of the Urala coastline, south west Pilbara. Note: Dissolved oxygen is only being analysed/recorded as field data and is not included in this table.

ANALYTE	SAMPLING INTERVAL		
	Months 1-6	Months 7-12	Months 13-18
Physical and Chemical Stressors			
<i>In-Situ Verification</i>			
pH	Monthly	Monthly	Monthly
Electrical Conductivity	all sites	5 sites 2 x depths	5 sites 2 x depths
Turbidity	all depths		
Total Dissolved Solids (TDS)	both laboratory and	5 sites 1 x depth	5 sites 1 x depth
Total Suspended Solids (TSS)	in-situ analysis		
Chlorophyll-a	where possible		
<i>Laboratory Parameters</i>			
Total Nitrogen (includes TN, TKN, NOx-N)		all samples verified	only parameters without
Nitrate-N		by laboratory and	in-situ verification
Nitrite-N		in-situ analysis	to be laboratory
Ammonia-N		where possible	analysed
Reactive Phosphorus			
Total Phosphorus			
Total Organic Carbon			
Metal and Metalloid Toxicants and Selenium			
Total - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	Monthly	Monthly (TBA)	Monthly (TBA)
Dissolved - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	all depths	5 sites x 2 depths	5 sites x 2 depths
Hydrocarbons		5 sites x 1 depth	5 sites x 1 depth
Organotins - TBT			
Polycyclic Aromatic Hydrocarbons (PAH) - Standard	laboratory analysis	laboratory analysis	laboratory analysis
Benzene Toluene Ethyl Benzene Xylenes (BTEX)			
Other Parameters			
BOD			
Dissolved Organic Carbon - as an indicator of CDOM			

4. October 2019 Water Quality Sampling

Overview

The field trip was undertaken between the 4th and 7th October 2019, by Paula Cartwright and Mick O'Leary. The field work usually requires two days on a vessel out of Exmouth

however, gale-force winds prevented the work being performed on the first day (5th October) and only one day of sampling (6th October) was undertaken this month.

Sampling was undertaken at sites 2 – 9 (Fly Island, Urala Creek South offshore, nearshore and channel, Urala Creek North nearshore and channel, Locker Point and Locker Island) with sites 1 and 10 (Eva Island and Rocky Point) not being sampled. Loggers were retrieved from Urala Creek South channel and Locker Point. Arrangements were made for the loggers to be redeployed the following day by Daemon Bass from TerraFirma Offshore.

Water Sampling

Water collection was conducted with an 8-litre niskin bottle specifically designed to allow for metals analysis. Sampling design is as per Table 1 (Months 7-12) where 5 sites are sampled at one depth and five sites at two depths. The sites sampled at one depth only were Urala Creek South Channel, UCS-Nearshore, UCS-Offshore and Urala Creek North channel. One replicate sample was taken from Fly Island (bottom water) and named Tent Island bottom.

NOTE: This month marks the end of the 7-12 month sampling interval as per Table 1. Therefore, the remaining analysis will consist of in-situ analysis only for those parameters that are able to be measured in-situ. These are pH, Conductivity, Turbidity, Total Dissolved Solids and Chlorophyll-a. Unless otherwise notified these parameters will be removed from ARL laboratory analysis henceforth.

Additionally, further advice is required on the need to continue with the monthly analysis for metals, metalloid toxicants, selenium, hydrocarbons, BOD and CDOM, or if any of these parameters can be reduced to bi-monthly/quarterly (as per table 1). Please advise ASAP.

Loggers

The loggers had been deployed in September as follows:

Urala Creek South –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x CTD

Locker Point –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x CTD
- 1 x Turbidity logger

The RBR logger in Urala Creek South did not collect data. The battery appeared low and subsequently was replaced before re-deployment however, it is not certain that this was the problem and the logger will be reassessed after the current deployment. All other loggers returned sound data for the entire period of deployment with no signs of fouling affecting outcome. Data is available in the Dropbox file under logger data.

New Loggers

The hired turbidity logger was replaced with the two purchased NTU meters which attach to the CTD ports and are logged by the CTD's. Both logger sites now have NTU, CTD and RBR's.

Marine Biota

There was a family pod of orcas in the gulf, as well as countless humpback whales. Sighted in Urala Creek South were turtles, a sting ray and a 1.5 metre shark (and a possible sawfish on the first northern sand bank after entering the creek).

Tidal Period

Neap tides.

Table 2: Tides at Y Island over the October 2019 water sampling period.

5	0159	2.10
	0848	0.36
	SA 1448	1.59
	2007	0.70
6	0231	1.93
	0931	0.52
	SU 1529	1.43
○	2036	0.84

In-situ Results

In-situ sampling was undertaken using a vertical profiling method. The sonde was set to continuous mode, with data logging at one second intervals, and the instrument was slowly lowered from the surface to bottom waters. This has provided up to 90 data points per site, dependent on the depth. Raw data available in K+S Dropbox>>Raw Data file>>In-Situ Water Quality.

Dissolved Oxygen readings were not able to be taken this month as the instrument (Hanna DO/BOD meter) was not functioning correctly. The instrument was taken back to Perth for assessment and should be ready for the November work.

Laboratory Results

The ARL analysis results are posted as soon as they are received. See K+S Dropbox >> Raw Data file.

5. Quality Control

Laboratory Samples

Water samples collected in the field requiring transport to laboratory for analysis were conducted in accordance with the standards outlined by ANZECC and the Government of Western Australia Department of Water's field sampling guidelines. Items were filtered, refrigerated or frozen as required and reached the laboratory within 24-36 hours of collection at sea.

Due to time limitations only one replicate sample was taken this month at Fly Island bottom and named Tent Island Bottom. A dummy site was created using distilled water. This was named Locker SW.

6. Budget

The budget is presented in Table 3.

Table 3: The actual expenses incurred undertaking the water quality sampling in September 2019 and the budgeted field costs.

Budget September	Actual Cost	Budgeted Cost
Field Trip		
Vessel Hire x 2 days inc. crew services	\$5,235.30	4000.00
Accommodation	Included in above	450.00
Airport Parking	96.76	0
Airport bus (Learmonth, two way)	75.00	0
Airfares x 1 pax	1125.90	800.00
Freight (airport excess)	Included in airfare	350.00
Misc. and Hardware	124.06	405.00
Dropbox for data sharing	18.69	0
Field Trip Total	6,675.71	6245.00

7. November Field Trip

The next field trip is planned for the 30th October – 3rd November and will incorporate the Water Technology ADCP profiling of Urala Creek South. Three days of field work instead of the usual two will be required to complete both water sampling and creek profiling.

Marine and Tidal Creek Water Quality Monitoring Project – November 2019

1. Introduction

This report was prepared for EnviroWorks Consulting by Paula Cartwright, University of Western Australia. The purpose of this report is to provide a monthly update of water quality data in accordance with the requirements under the contractual agreement between the University of Western Australia and K+S Salt.

2. Objectives

Assess spatial and temporal variability of key water quality parameters over an 18-month period within the Exmouth Gulf. Specific objectives of the monitoring program are

- 1) To characterise baseline water quality conditions
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- 3) To assess water quality variability between locations, top and bottom waters, spring and neap tides
- 4) To collect additional data on wave, currents, temperature and salinity to validate hydrodynamic models

3. Monthly Monitoring Requirements

The monthly water quality sampling requirements are

- Water quality sampling to take place at ten pre-determined sites along the Urala creek coastline (Figure 1) as well as 2 duplicates and a blank.
- Samples of surface and bottom waters collected and analysed in a laboratory for the parameters listed in Table 1. From month 7 water will be collected from only one depth at five of the ten sites. The bottling needs for laboratory analysis of these parameters consist of the following for each depth at each site:
 - 2 x 1 litre glass bottle
 - 1 x 500 mL polycarbonate bottle
 - 2 x 250 mL plastic bottle
 - 4 x 125 mL plastic bottle
 - 4 x 40 mL glass vial
- In-situ measurements of water quality performed with a multiple parameter Sonde deployed from the boat for dip and read measurements (total dissolved sediments, turbidity, salinity, pH, dissolved oxygen, chlorophyll a and temperature) encompassing a full vertical profiling at each site (except for dissolved O₂ which is only a top and bottom reading only).

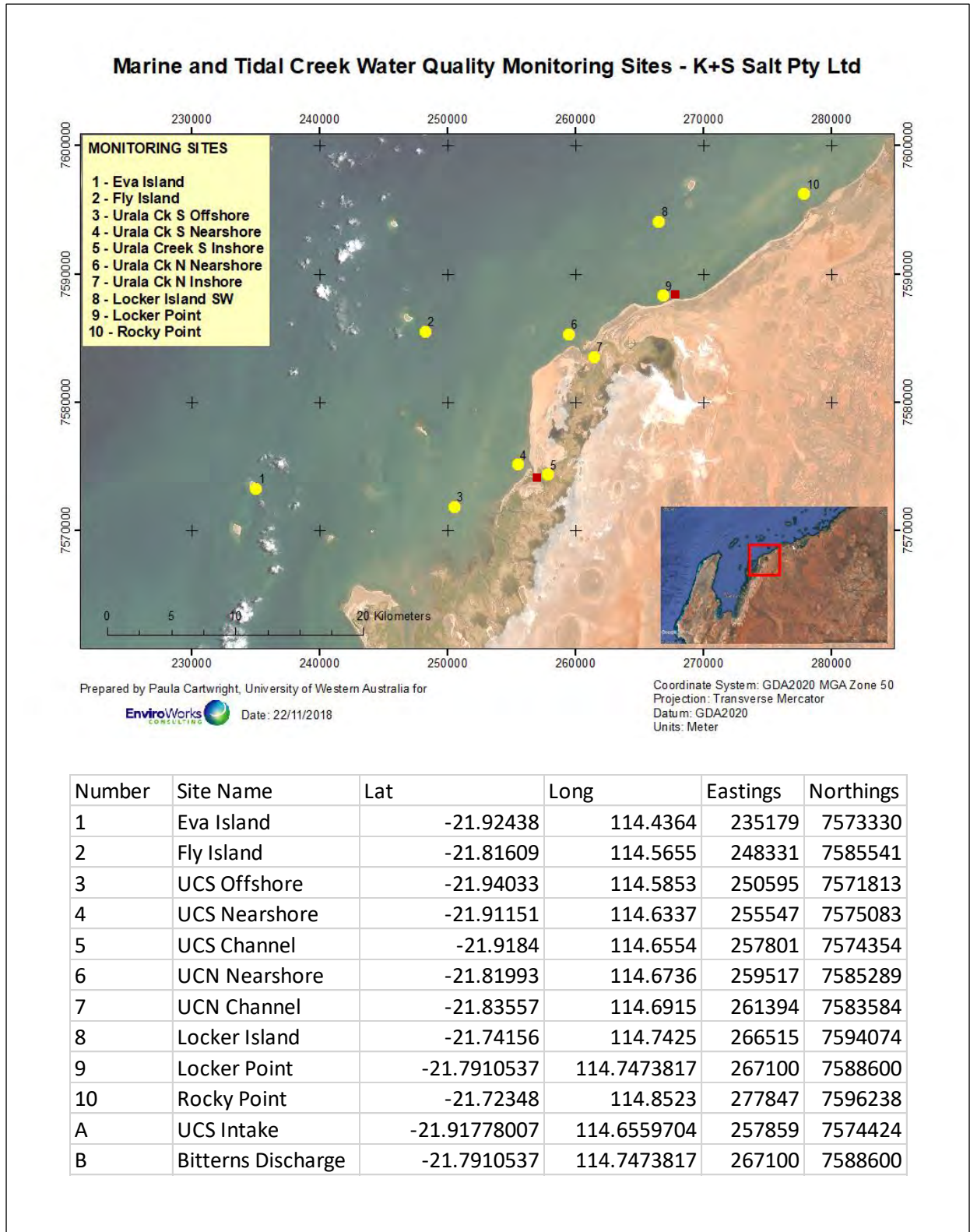


Figure 1: Map and spatial data for ten water collection sites (1-10) and two logger deployment sites (A, B) along the inshore, near shore and offshore sections of the Urala coast, south-west Pilbara. Note: The Urala Creek South and Urala Creek North inshore sites are also known as UCS and UCN Channels.

Table 1: Water quality sampling parameters for laboratory and in-situ analysis at ten sites across the inshore, near shore and off shore regions of the Urala coastline, south west Pilbara. Note: Dissolved oxygen is only being analysed/recorded as field data and is not included in this table.

ANALYTE	SAMPLING INTERVAL		
	Months 1-6	Months 7-12	Months 13-18
Physical and Chemical Stressors			
<i>In-Situ Verification</i>			
pH	Monthly	Monthly	Monthly
Electrical Conductivity	all sites	5 sites 2 x depths	5 sites 2 x depths
Turbidity	all depths		
Total Dissolved Solids (TDS)	both laboratory and	5 sites 1 x depth	5 sites 1 x depth
Total Suspended Solids (TSS)	in-situ analysis		
Chlorophyll-a	where possible		
<i>Laboratory Parameters</i>			
Total Nitrogen (includes TN, TKN, NOx-N)		all samples verified	only sites without in-situ verification
Nitrate-N		by laboratory and in-situ analysis where possible	to be laboratory analysed
Nitrite-N			
Ammonia-N			
Reactive Phosphorus			
Total Phosphorus			
Total Organic Carbon			
Metal and Metalloid Toxicants and Selenium			
Total - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	Monthly	Monthly (TBA)	Monthly (TBA)
Dissolved - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	all depths	5 sites x 2 depths	5 sites x 2 depths
Hydrocarbons		5 sites x 1 depth	5 sites x 1 depth
Organotins - TBT			
Polycyclic Aromatic Hydrocarbons (PAH) - Standard	laboratory analysis	laboratory analysis	laboratory analysis
Benzene Toluene Ethyl Benzene Xylenes (BTEX)			
Other Parameters			
BOD			
Dissolved Organic Carbon - as an indicator of CDOM			

4. November 2019 Water Quality Sampling

Overview

The work was undertaken on the 29th October – 2nd November 2019, by Paula Cartwright, Mick O’Leary, Shannon Dee and Michael Milohis and incorporated the ADCP profiling of

Urala Creek South. The field work required three days on the larger Optimus vessel out of Exmouth, for which the services of TerraFirma Offshore Commercial Marine were used.

On day one sites 8, 9 and 10 were sampled and loggers were retrieved from Locker Point and Urala Creek South. On day two sites 3, 4, 5 and 6, were sampled and loggers re-deployed at Locker Point and Urala Creek South. On day 3 sites 1 and 2 were sampled. Site 7 was not sampled as the large vessel was unable to enter Urala Creek North and the smaller tender was being used for the profiling of Urala Creek South.

Water Sampling

Water collection was conducted with an 8-litre niskin bottle specifically designed to allow for metals analysis. Sampling design is as per Table 1 (Months 7-12) where 5 sites are sampled at one depth and five sites at two depths, as per advice from EnviroWorks to stay with this regime for the remaining months of the project. The sites sampled at one depth only were Urala Creek South Channel, UCS-Nearshore, UCS-Offshore and Rocky Point. Two replicate samples were taken from Rocky Point and Urala Creek South-Near shore (top). These were named Tent Island bottom and top respectively.

Very strong winds (> 25 knots) on days 2 and 3 prevented departure before 10.30 am. The crossing of the gulf on all 3 days was difficult to extreme and could not have been attempted in a less capable vessel than the Optimus. Conditions were very turbid along the entire Urala Creek to Rocky Point coastline.

Loggers

The loggers had been deployed in August as follows:

Urala Creek South –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x CTD
- 1 x Turbidity logger

Locker Point –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x CTD
- 1 x Turbidity logger

The RBR loggers both had dead batteries and returned no data for this deployment. All other loggers returned sound data for the entire period of deployment with no signs of fouling affecting outcome. The RBR's were serviced and tested before re-deployment and are expected to be working now. Data is available in the Dropbox file under logger data.

Marine Biota

Dugong at Fly Island.

Tidal Period

Spring tides. Very low lows. Large tidal range.

Table 2: Tides at Y Island over the September 2019 water sampling period.

31	0001	2.35
	0640	0.03
TH	1256	1.92
	1818	0.51
1	0031	2.29
	0715	0.08
FR	1329	1.81
	1847	0.58
2	0101	2.17
	0751	0.18
SA	1402	1.70
	1916	0.66

In-situ Results

In-situ sampling was undertaken using a vertical profiling method opposed to a top and bottom logging. The sonde was set to continuous mode, with data logging at one second intervals, and the instrument was slowly lowered from the surface to bottom waters. This has provided up to 90 data points per site, dependent on the depth. The sonde was not taken on the vessel on day 2 and no in-situ data is available for sites 3, 4, 5 and 6. Raw data available in K+S Dropbox>>Raw Data file>>In-Situ Water Quality.

Laboratory Results

The ARL analysis results are posted as soon as they are received. See K+S Dropbox >> Raw Data file.

5. Quality Control

Laboratory Samples

Water samples collected in the field requiring transport to laboratory for analysis were conducted in accordance with the standards outlined by ANZECC and the Government of Western Australia Department of Water's field sampling guidelines. Items were filtered, refrigerated or frozen as required and reached the laboratory within 24-54 hours of collection at sea.

Two replicate sample were taken at Rocky Point and Eva Island Bottom and named Tent Island Top and Tent Island Bottom respectively. A dummy site was also created using distilled water. This was named Locker SW.

6. Budget

The budget is presented in Table 3. K+S was invoice directly for the vessel hire costs.

Table 3: The budgeted and actual expenses incurred undertaking the water quality sampling as well as the ADCP profiling of Urala Creek South in November 2019.

Budget September	Actual Cost	Budgeted Cost
Field Trip		
Vessel Hire x 2 days inc. crew services	0	4000.00
Accommodation	800.00	450.00
Car Hire	454.27	240.00
Airfares x 2 pax	444.77 746.77	800.00
Freight (airport excess)	Included in 2 nd airfare	350.00
Misc. and Hardware	77.19 252.17	405.00
Dropbox for data sharing	18.69	0
Field Trip Total	2793.86	6245.00

7. December Field Trip

The next field trip is planned for the 30th November – 3rd December.

Marine and Tidal Creek Water Quality Monitoring Project – December 2019

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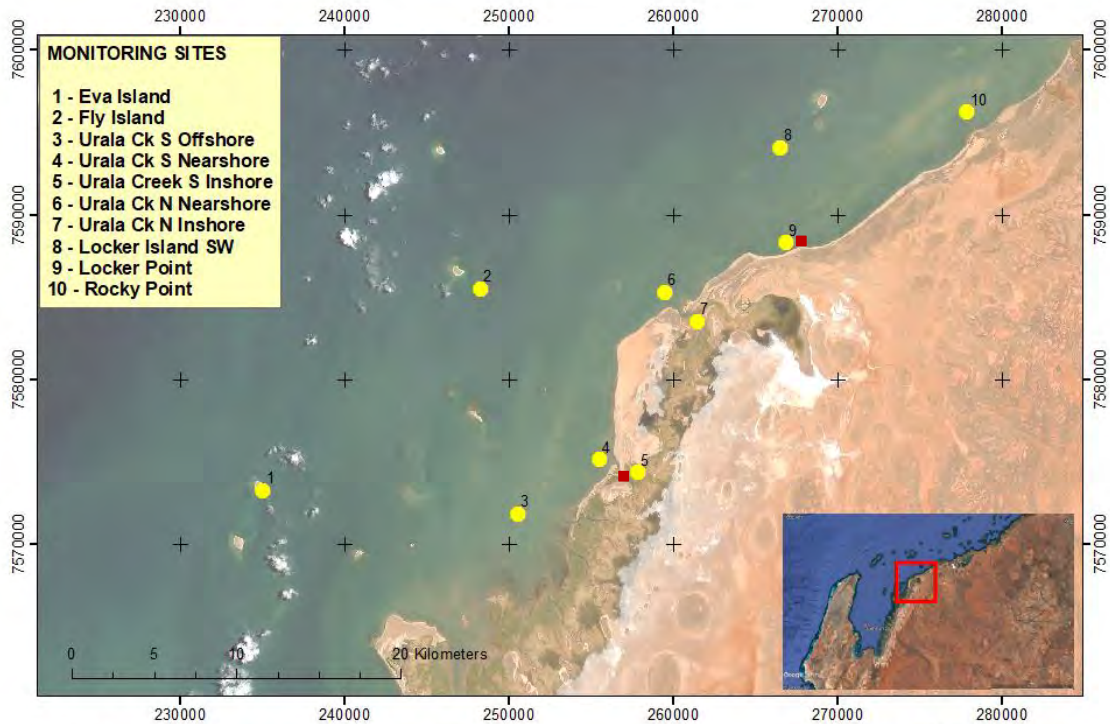
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3. Monthly Monitoring Requirements

The monthly water quality sampling requirements are

- Water quality sampling to take place at ten pre-determined sites along the Urala creek coastline (Figure 1) as well as 2 duplicates and a blank.
- Samples of surface and bottom waters collected and analysed in a laboratory for the parameters listed in Table 1. From month 7 water will be collected from only one depth at five of the ten sites. The bottling needs for laboratory analysis of these parameters consist of the following for each depth at each site:
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 - 4 x 40 mL glass vial
- In-situ measurements of water quality performed with a multiple parameter Sonde deployed from the boat for dip and read measurements (total dissolved sediments, turbidity, salinity, pH, dissolved oxygen, chlorophyll a and temperature) encompassing a full vertical profiling at each site (except for dissolved O₂ which is only a top and bottom reading only).

Marine and Tidal Creek Water Quality Monitoring Sites - K+S Salt Pty Ltd



Prepared by Paula Cartwright, University of Western Australia for

EnviroWorks CONSULTING Date: 22/11/2018

Coordinate System: GDA2020 MGA Zone 50
Projection: Transverse Mercator
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Units: Meter

Number	Site Name	Lat	Long	Eastings	Northings
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ANALYTE	SAMPLING INTERVAL		
	Months 1-6	Months 7-12	Months 13-18
Physical and Chemical Stressors			
<i>In-Situ Verification</i>			
pH	Monthly	Monthly	Monthly
Electrical Conductivity	all sites	5 sites 2 x depths	5 sites 2 x depths
Turbidity	all depths		
Total Dissolved Solids (TDS)	both laboratory and	5 sites 1 x depth	5 sites 1 x depth
Total Suspended Solids (TSS)	in-situ analysis		
Chlorophyll-a	where possible		
<i>Laboratory Parameters</i>			
Total Nitrogen (includes TN, TKN, NOx-N)		all samples verified	all samples verified by laboratory and in-situ analysis where possible
Nitrate-N		by laboratory and in-situ analysis where possible	
Nitrite-N			
Ammonia-N			
Reactive Phosphorus			
Total Phosphorus			
Total Organic Carbon			
Metal and Metalloid Toxicants and Selenium			
Total - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	Monthly	Monthly (TBA)	Monthly (TBA)
Dissolved - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	all depths	5 sites x 2 depths	5 sites x 2 depths
Hydrocarbons		5 sites x 1 depth	5 sites x 1 depth
Organotins - TBT			
Polycyclic Aromatic Hydrocarbons (PAH) - Standard	laboratory analysis	laboratory analysis	laboratory analysis
Benzene Toluene Ethyl Benzene Xylenes (BTEX)			
Other Parameters			
BOD			
Dissolved Organic Carbon - as an indicator of CDOM			

4. December Water Quality Sampling

Overview

The work was undertaken on the 29th November - 2nd December 2019, by Paula Cartwright. The field work required two days on a vessel out of Exmouth, for which the services of TerraFirma Offshore Commercial Marine were used.

On day one sites 3, 4, 5, 6, 8, 9 and 10 were sampled and loggers were retrieved from Locker Point and Urala Creek South. On day two sites 1, 2 and 7 were sampled and loggers re-deployed at Locker Point and Urala Creek South.

Water Sampling

Water collection was conducted with an 8-litre niskin bottle specifically designed to allow for metals analysis. Sampling design is as per Table 1 (Months 13-18) where 5 sites are sampled at one depth and five sites at two depths. The sites sampled at one depth only were Urala Creek South Channel, UCS-Nearshore, UCS-Offshore, Urala Creek North channel and Rocky Point. Two replicate samples were taken from Fly Island (top) and Urala Creek North channel. These were named Tent Island top and bottom respectively.

Loggers

The loggers had been deployed in November as follows:

Urala Creek South –

- 1 x RBRsolo³ D | Depth Logger
- 1 x CTD
- 1 x NTU sensor (turbidity)

Locker Point –

- 1 x RBRsolo³ D | Depth/Wave Logger
- 1 x CTD
- 1 x NTU sensor (turbidity)

All loggers returned sound data for the entire period of deployment with no signs of fouling affecting outcome. Data is available in the Dropbox file under logger data.

Marine Biota Sighted

Dugongs at Fly Island and offshore from Tubridgi Point. Shark (~1.3 m) in Urala Creek South. Large squid swimming on surface at Eva Island.

Tidal Period

Between spring and neap tides.

Table 2: Tides at Y Island over the December 2019 water sampling period.

30	0012	2.19	1	0045	2.08
	0703	0.08		0738	0.17
	SA 1322	1.75	SU 1355	1.68	
	1831	0.67	1905	0.72	

In-situ Results

In-situ sampling was undertaken using a vertical profiling method opposed to a top and bottom logging. The sonde was set to continuous mode, with data logging at one second intervals, and the instrument was slowly lowered from the surface to bottom waters. This has provided up to 90 data points per site, dependent on the depth. Raw data available in K+S Dropbox>>Raw Data file>>In-Situ Water Quality.

Laboratory Results

The ARL analysis results are posted as soon as they are received. See K+S Dropbox >> Raw Data file.

5. Quality Control

Laboratory Samples

Water samples collected in the field requiring transport to laboratory for analysis were conducted in accordance with the standards outlined by ANZECC and the Government of Western Australia Department of Water's field sampling guidelines. Items were filtered, refrigerated or frozen as required and reached the laboratory within 24-30 hours of collection at sea.

Two replicate sample were taken at Fly Island (top) and Urala Creek North Channel and named Tent Island Top and Tent Island Bottom respectively. A dummy site was also created using Exmouth tap water. This was named Locker SW.

6. Budget

The budget is presented in Table 3.

Table 3: The actual expenses incurred undertaking the water quality sampling in September 2019 and the budgeted field costs.

Budget September	Actual Cost	Budgeted Cost
Field Trip		
Vessel Hire x 2 days inc. crew services	\$5,643.13	4000.00
Accommodation	Included in above	450.00
Car Hire	0	240.00
Airport bus (Learmonth, two way)	75.00	0
Airfares x 1 pax	706.77	800.00
Freight (airport excess)	Included in airfare	350.00
Misc. and Hardware	91.48	405.00
Dropbox for data sharing	18.69	0

Field Trip Total	6535.07	6245.00
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7. January Field Trip

The next field trip is planned for the 28th – 31st December and will constitute the January sampling. February sampling will take place in the first week of February and will incorporate the AECOM habitat surveys of Urala Creek South nearshore benthic environment.

Marine and Tidal Creek Water Quality Monitoring Project – January 2020

1. Introduction

This report was prepared for EnviroWorks Consulting by Paula Cartwright, University of Western Australia. The purpose of this report is to provide a monthly update of water quality data in accordance with the requirements under the contractual agreement between the University of Western Australia and K+S Salt.

2. Objectives

Assess spatial and temporal variability of key water quality parameters over an 18-month period within the Exmouth Gulf. Specific objectives of the monitoring program are

- 1) To characterise baseline water quality conditions
- 2) To account for seasonal variations in water quality
- 3) To assess water quality variability between locations, top and bottom waters, spring and neap tides
- 4) To collect additional data on wave, currents, temperature and salinity to validate hydrodynamic models

3. Monthly Monitoring Requirements

The monthly water quality sampling requirements are

- Water quality sampling to take place at ten pre-determined sites along the Urala creek coastline (Figure 1) as well as 2 duplicates and a blank.
- Samples of surface and bottom waters collected and analysed in a laboratory for the parameters listed in Table 1. From month 7 water will be collected from only one depth at five of the ten sites. The bottling needs for laboratory analysis of these parameters consist of the following for each depth at each site:
 - 2 x 1 litre glass bottle
 - 1 x 500 mL polycarbonate bottle
 - 2 x 250 mL plastic bottle
 - 4 x 125 mL plastic bottle
 - 4 x 40 mL glass vial
- In-situ measurements of water quality performed with a multiple parameter Sonde deployed from the boat for dip and read measurements (total dissolved sediments, turbidity, salinity, pH, dissolved oxygen, chlorophyll a and temperature) encompassing a full vertical profiling at each site (except for dissolved O₂ which is only a top and bottom reading only).

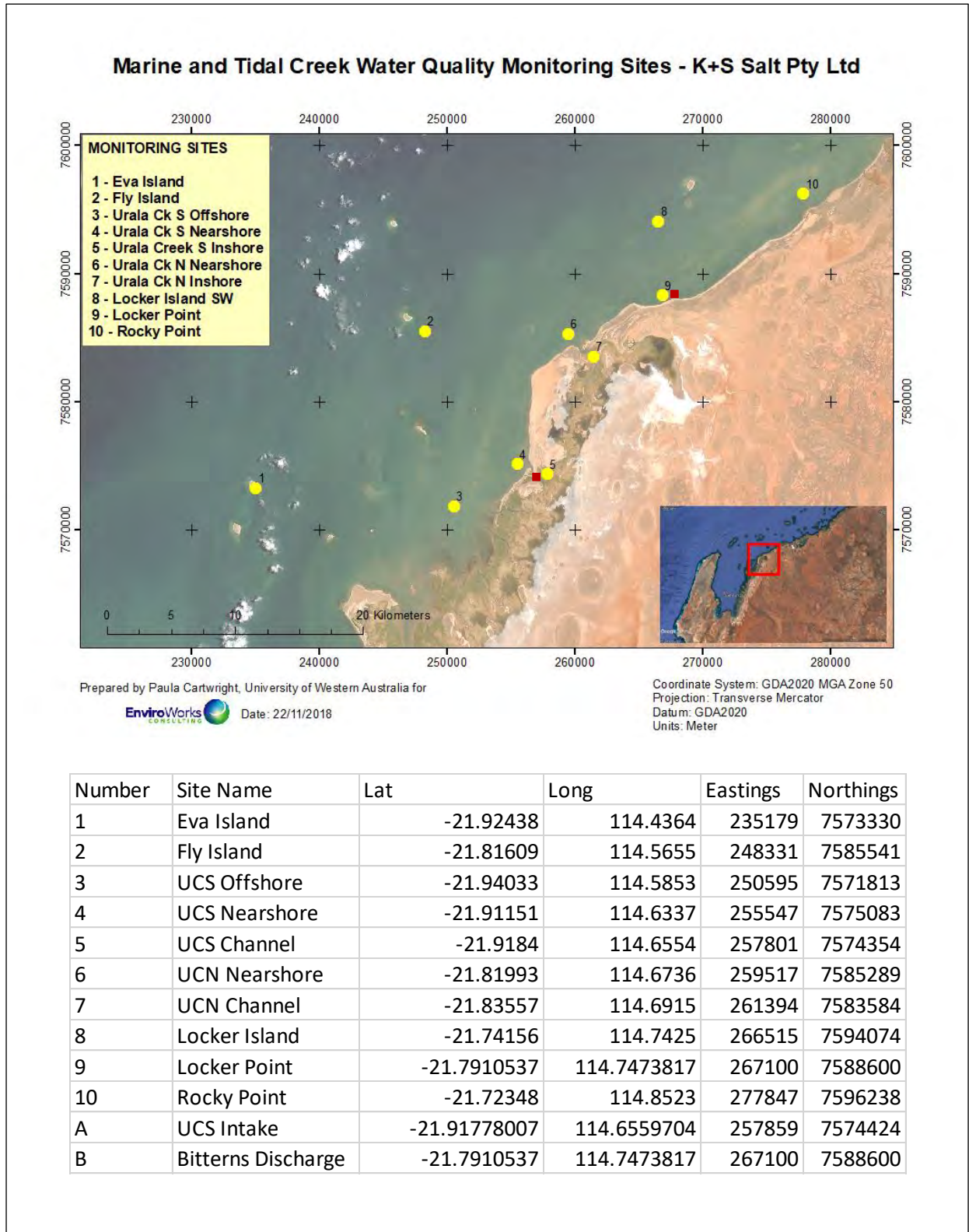


Figure 1: Map and spatial data for ten water collection sites (1-10) and two logger deployment sites (A, B) along the inshore, near shore and offshore sections of the Urala coast, south-west Pilbara. Note: The Urala Creek South and Urala Creek North inshore sites are also known as UCS and UCN Channels.

Table 1: Water quality sampling parameters for laboratory and in-situ analysis at ten sites across the inshore, near shore and off shore regions of the Urala coastline, south west Pilbara. Note: Dissolved oxygen is only being analysed/recorded as field data and is not included in this table.

ANALYTE	SAMPLING INTERVAL		
	Months 1-6	Months 7-12	Months 13-18
Physical and Chemical Stressors			
<i>In-Situ Verification</i>			
pH	Monthly	Monthly	Monthly
Electrical Conductivity	all sites	5 sites 2 x depths	5 sites 2 x depths
Turbidity	all depths		
Total Dissolved Solids (TDS)	both laboratory and	5 sites 1 x depth	5 sites 1 x depth
Total Suspended Solids (TSS)	in-situ analysis		
Chlorophyll-a	where possible		
<i>Laboratory Parameters</i>			
Total Nitrogen (includes TN, TKN, NOx-N)		all samples verified	all samples verified by laboratory and in-situ analysis where possible
Nitrate-N		by laboratory and in-situ analysis where possible	
Nitrite-N			
Ammonia-N			
Reactive Phosphorus			
Total Phosphorus			
Total Organic Carbon			
Metal and Metalloid Toxicants and Selenium			
Total - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	Monthly	Monthly (TBA)	Monthly (TBA)
Dissolved - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	all depths	5 sites x 2 depths	5 sites x 2 depths
Hydrocarbons			
Organotins - TBT		5 sites x 1 depth	5 sites x 1 depth
Polycyclic Aromatic Hydrocarbons (PAH) - Standard	laboratory analysis	laboratory analysis	laboratory analysis
Benzene Toluene Ethyl Benzene Xylenes (BTEX)			
Other Parameters			
BOD			
Dissolved Organic Carbon - as an indicator of CDOM			

4. January Water Quality Sampling

Overview

The work was undertaken directly prior to the beginning of January on the 29th - 30st December 2019, by Paula Cartwright. The field work required two days on a vessel out of Exmouth, for which the services of TerraFirma Offshore Commercial Marine were used.

On day one all sites were sampled and loggers were retrieved from Locker Point and Urala Creek South. On day two sites loggers re-deployed at Locker Point and Urala Creek South. The work was able to be performed faster than usual (on day 1) as the DO Meter was still being serviced and this (time consuming) task was not performed.

Water Sampling

Water collection was conducted with an 8-litre niskin bottle specifically designed to allow for metals analysis. Sampling design is as per Table 1 (Months 13-18) where 5 sites are sampled at one depth and five sites at two depths. The sites sampled at one depth only were Urala Creek South Channel, UCS-Nearshore, UCS-Offshore, Urala Creek North channel and Rocky Point. Two replicate samples were taken from Eva Island (top and bottom) and named Tent Island top and bottom.

Loggers

The loggers had been deployed in December as follows:

Urala Creek South –

- 1 x RBR*solo*³ D | Depth Logger
- 1 x CTD
- 1 x NTU sensor (turbidity)

Locker Point –

- 1 x RBR*solo*³ D | Depth/Wave Logger
- 1 x CTD
- 1 x NTU sensor (turbidity)

The CTD/NTU logger from Locker Point did not return any data from the previous deployment. It appears the switch was inadvertently knocked from the ‘on’ position during the previous launch as it recorded the initial burst of data then stopped. The equipment does have a locking pin however it does lock down on this logger. Extra care needs to be taken to ensure this doesn’t happen in future deployments. It may be worth returning the logger to manufacturer to have this fault fixed if the logger is going to be in long term use. All other loggers returned sound data for the entire period of deployment with no signs of fouling affecting outcome. Data is available in the Dropbox file under logger data.

Tidal Period

Spring Tides

Table 2: Tides at Y Island over the January 2020 (undertaken end December 2019) water sampling period.

29	0004	2.09
	0654	0.11
	SU 1314	1.75
	1827	0.69
30	0041	2.01
	0727	0.16
	MO 1345	1.73
	1903	0.70

In-situ Results

In-situ sampling was undertaken using a vertical profiling method with an Exo Sonde 3. The sonde was set to continuous mode, with data logging at one second intervals, and the instrument was slowly lowered from the surface to bottom waters. This has provided up to 90 data points per site, dependent on the depth. Raw data available in K+S Dropbox>>>Raw Data file>>>In-Situ Water Quality.

Laboratory Results

The ARL analysis results are posted as soon as they are received. See K+S Dropbox >> Raw Data file.

5. Quality Control

Laboratory Samples

Water samples collected in the field requiring transport to laboratory for analysis were conducted in accordance with the standards outlined by ANZECC and the Government of Western Australia Department of Water's field sampling guidelines. Items were filtered, refrigerated or frozen as required and reached the laboratory within 24-30 hours of collection at sea.

Two replicate sample were taken at Eva Island (top and bottom) and named Tent Island Top and Tent Island Top and Bottom respectively. A dummy site was also created using store bought spring water. This was named Locker SW.

6. Budget

The budget is presented in Table 3.

Table 3: The actual expenses incurred undertaking the water quality sampling in September 2019 and the budgeted field costs.

Budget September	Actual Cost	Budgeted Cost
Field Trip		
Vessel Hire x 2 days inc. crew services	\$5,264.54	4000.00

Accommodation	Included in above	450.00
Car Hire	0	240.00
Airport bus (Learmonth, two way)	30.00	0
Airfares x 1 pax	793.09	800.00
Freight (airport excess)	Included in airfare	350.00
Misc. and Hardware	165.26	405.00
Dropbox for data sharing	18.69	0
Field Trip Total	6271.58	6245.00

7. February Field Trip

The next field trip is planned for the 3rd to 5th February and will incorporate the AECOM habitat survey of Urala Creek South nearshore benthic environment.

Marine and Tidal Creek Water Quality Monitoring Project – February 2020

1. Introduction

This report was prepared for EnviroWorks Consulting by Paula Cartwright, University of Western Australia. The purpose of this report is to provide a monthly update of water quality data in accordance with the requirements under the contractual agreement between the University of Western Australia and K+S Salt.

2. Objectives

Assess spatial and temporal variability of key water quality parameters over an 18-month period within the Exmouth Gulf. Specific objectives of the monitoring program are

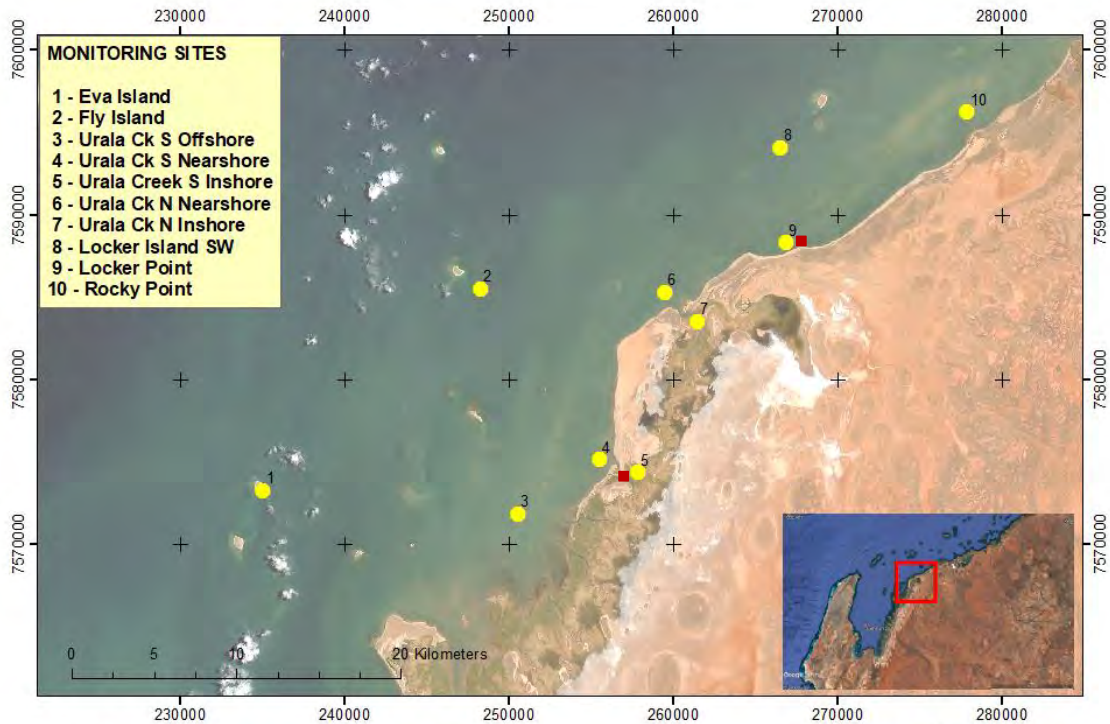
- 1) To characterise baseline water quality conditions
- 2) To account for seasonal variations in water quality
- 3) To assess water quality variability between locations, top and bottom waters, spring and neap tides
- 4) To collect additional data on wave, currents, temperature and salinity to validate hydrodynamic models

3. Monthly Monitoring Requirements

The monthly water quality sampling requirements are

- Water quality sampling to take place at ten pre-determined sites along the Urala creek coastline (Figure 1) as well as 2 duplicates and a blank.
- Samples of surface and bottom waters collected and analysed in a laboratory for the parameters listed in Table 1. From month 7 water will be collected from only one depth at five of the ten sites. The bottling needs for laboratory analysis of these parameters consist of the following for each depth at each site:
 - 2 x 1 litre glass bottle
 - 1 x 500 mL polycarbonate bottle
 - 2 x 250 mL plastic bottle
 - 4 x 125 mL plastic bottle
 - 4 x 40 mL glass vial
- In-situ measurements of water quality performed with a multiple parameter Sonde deployed from the boat for dip and read measurements (total dissolved sediments, turbidity, salinity, pH, dissolved oxygen, chlorophyll a and temperature) encompassing a full vertical profiling at each site (except for dissolved O₂ which is only a top and bottom reading only).

Marine and Tidal Creek Water Quality Monitoring Sites - K+S Salt Pty Ltd



Prepared by Paula Cartwright, University of Western Australia for

EnviroWorks Date: 22/11/2018

Coordinate System: GDA2020 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA2020
Units: Meter

Number	Site Name	Lat	Long	Eastings	Northings
1	Eva Island	-21.92438	114.4364	235179	7573330
2	Fly Island	-21.81609	114.5655	248331	7585541
3	UCS Offshore	-21.94033	114.5853	250595	7571813
4	UCS Nearshore	-21.91151	114.6337	255547	7575083
5	UCS Channel	-21.9184	114.6554	257801	7574354
6	UCN Nearshore	-21.81993	114.6736	259517	7585289
7	UCN Channel	-21.83557	114.6915	261394	7583584
8	Locker Island	-21.74156	114.7425	266515	7594074
9	Locker Point	-21.7910537	114.7473817	267100	7588600
10	Rocky Point	-21.72348	114.8523	277847	7596238
A	UCS Intake	-21.91778007	114.6559704	257859	7574424
B	Bitterns Discharge	-21.7910537	114.7473817	267100	7588600

Figure 1: Map and spatial data for ten water collection sites (1-10) and two logger deployment sites (A, B) along the inshore, near shore and offshore sections of the Urala coast, south-west Pilbara. Note: The Urala Creek South and Urala Creek North inshore sites are also known as UCS and UCN Channels.

Table 1: Water quality sampling parameters for laboratory and in-situ analysis at ten sites across the inshore, near shore and off shore regions of the Urala coastline, south west Pilbara. Note: Dissolved oxygen is only being analysed/recorded as field data and is not included in this table.

ANALYTE	SAMPLING INTERVAL		
	Months 1-6	Months 7-12	Months 13-18
Physical and Chemical Stressors			
<i>In-Situ Verification</i>			
pH	Monthly	Monthly	Monthly
Electrical Conductivity	all sites	5 sites 2 x depths	5 sites 2 x depths
Turbidity	all depths		
Total Dissolved Solids (TDS)	both laboratory and	5 sites 1 x depth	5 sites 1 x depth
Total Suspended Solids (TSS)	in-situ analysis		
Chlorophyll-a	where possible		
<i>Laboratory Parameters</i>			
Total Nitrogen (includes TN, TKN, NOx-N)		all samples verified	all samples verified by laboratory and in-situ analysis where possible
Nitrate-N		by laboratory and in-situ analysis where possible	
Nitrite-N			
Ammonia-N			
Reactive Phosphorus			
Total Phosphorus			
Total Organic Carbon			
Metal and Metalloid Toxicants and Selenium			
Total - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	Monthly	Monthly (TBA)	Monthly (TBA)
Dissolved - Ca, Mg, K, Al, Mn, Sn, V, Zn, As, Cr, Co, Cu, Pb, Ni, Cd, Hg, Se	all depths	5 sites x 2 depths	5 sites x 2 depths
Hydrocarbons		5 sites x 1 depth	5 sites x 1 depth
Organotins - TBT			
Polycyclic Aromatic Hydrocarbons (PAH) - Standard	laboratory analysis	laboratory analysis	laboratory analysis
Benzene Toluene Ethyl Benzene Xylenes (BTEX)			
Other Parameters			
BOD			
Dissolved Organic Carbon - as an indicator of CDOM			

4. February Water Quality Sampling

Overview

The work was undertaken on the 4th and 5th of February 2020 by Paula Cartwright. The field work required two days on a vessel out of Exmouth, for which the services of TerraFirma Offshore Commercial Marine were used.

On day one sites 2, 3, 4, 5, 8, 9, and 10 were sampled and loggers were retrieved from Locker Point and Urala Creek South. On day two sites 1, 6 and 7 were sampled and loggers re-deployed at Locker Point and Urala Creek South.

Water Sampling

Water collection was conducted with an 8-litre niskin bottle specifically designed to allow for metals analysis. Sampling design is as per Table 1 (Months 13-18) where 5 sites are sampled at one depth and five sites at two depths. The sites sampled at one depth only were Urala Creek South Channel, UCS-Nearshore, UCS-Offshore, Urala Creek North channel and Rocky Point. Two replicate samples were taken from Eva Island (top and bottom) and named Tent Island top and bottom.

Loggers

The loggers had been deployed for the month of January as follows:

Urala Creek South –

- 1 x RBRsolo³ D | Depth Logger
- 1 x CTD
- 1 x NTU sensor (turbidity)

Locker Point –

- 1 x RBRsolo³ D | Depth/Wave Logger
- 1 x CTD
- 1 x NTU sensor (turbidity)

All loggers returned sound data for the entire period of deployment with no signs of fouling affecting outcome. Data is available in the Dropbox file under logger data.

Tidal Period

Spring Tides

Table 2: Tides at Y Island over the February 2020 water sampling period

4	0517	1.61	↓
	1009	1.29	
	TU 1725	2.12	

5	0112	1.15	↓
	0723	1.53	
	WE 1113	1.44	
	1850	2.10	

In-situ Results

In-situ sampling was undertaken using a vertical profiling method with an Exo Sonde 2. The sonde was set to continuous mode, with data logging at one second intervals, and the instrument was slowly lowered from the surface to bottom waters. This has provided up to 90 data points per site, dependent on the depth. Raw data available in K+S Dropbox>>Raw Data file>>In-Situ Water Quality.

Laboratory Results

The ARL analysis results are posted as soon as they are received. See K+S Dropbox >> Raw Data file.

5. Quality Control

Laboratory Samples

Water samples collected in the field requiring transport to laboratory for analysis were conducted in accordance with the standards outlined by ANZECC and the Government of Western Australia Department of Water's field sampling guidelines. Items were filtered, refrigerated or frozen as required and reached the laboratory within 24-52 hours of collection at sea.

Two replicate sample were taken at Eva Island (top and bottom) and named Tent Island Top and Tent Island Top and Bottom respectively. A dummy site was also created using Exmouth tap water. This was named Locker SW.

6. Budget

The budget is presented in Table 3.

Table 3: The actual expenses incurred undertaking the water quality sampling in September 2019 and the budgeted field costs.

Budget September	Actual Cost	Budgeted Cost
Field Trip		
Vessel Hire x 2 days inc. crew services	\$5,264.54	4000.00
Accommodation	Included in above	450.00
Car Hire	0	240.00
Airport bus (Learmonth, two way)	75.00	0
Airfares x 1 pax	654.06	800.00
Freight (airport excess)	Included in airfare	350.00
Misc. and Hardware	123.35	405.00
Dropbox for data sharing	18.69	0

Field Trip Total	6135.64	6245.00
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7. March Field Trip

The March field trip dates are yet to be decided but are likely to take place in late March.



APPENDIX B ARL LABORATORY REPORTS



LABORATORY REPORT

Job Number: 18-17286
Revision: 00
Date: 27 November 2018

ADDRESS: University of WA

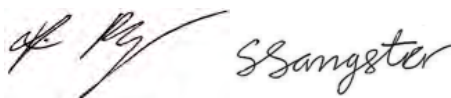
ATTENTION: Paula Cartwright

DATE RECEIVED: 19/11/2018

YOUR REFERENCE: University of WA; K+S Project

PURCHASE ORDER: K+S

APPROVALS:



Kim Rodgers
General Manager

Sean Sangster
Inorganics Supervisor

REPORT COMMENTS:

This report is issued by Analytical Reference Laboratory (WA) Pty Ltd
Samples are analysed on an as received basis unless otherwise noted.
Total Organic Carbon analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 218918

METHOD REFERENCES:

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377
Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561

ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 014	pH in Water
ARL No. 141	Chlorophyll-a and Pheophytin-a in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids
ARL No. 016	Total Suspended Solids
ARL No. 045	Turbidity
Subcontracting	See Report Comments section for more information.



ARL GROUP

46-48 Banksia Road, Welshpool, Western Australia 6106
Telephone: 08 6253 4444 Facsimile: 08 6253 4440 www.arlgroup.com.au

LABORATORY REPORT

University of WA

ARL Job No: 18-17286

Revision: 00

Date: 27 November 2018

Total Nitrogen in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-1 Rocky Point Top 18/11/2018	18-17286-2 Rocky Point Bottom 18/11/2018	18-17286-3 Locker Point Top 18/11/2018	18-17286-4 Locker Point Bottom 18/11/2018	18-17286-5 UCS - Off Top 17/11/2018
Total Nitrogen	0.2	mg/L	0.6	0.6	0.5	0.6	0.5
Total Kjeldahl Nitrogen	0.2	mg/L	0.6	0.6	0.5	0.6	0.5

Total Nitrogen in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-6 UCS - Off Bottom 17/11/2018	18-17286-7 Locker - SW Top 18/11/2018	18-17286-8 Locker - SW Bottom 18/11/2018	18-17286-9 EVA Top 17/11/2018	18-17286-10 EVA Bottom 17/11/2018
Total Nitrogen	0.2	mg/L	1.3	0.9	0.4	0.2	0.2
Total Kjeldahl Nitrogen	0.2	mg/L	1.3	0.9	0.4	0.2	0.2

Total Nitrogen in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-11 UCS - Inshore Top 17/11/2018	18-17286-12 UCS - Inshore Bottom 17/11/2018	18-17286-13 UCN - New Top 17/11/2018	18-17286-14 UCN - Near Bottom 17/11/2018	18-17286-15 Fly Top 17/11/2018
Total Nitrogen	0.2	mg/L	0.6	0.2	<0.2	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	0.6	0.2	<0.2	<0.2	<0.2

Total Nitrogen in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-16 Fly Bottom 17/11/2018	18-17286-17 NCN - Inshore Top 17/11/2018	18-17286-18 NCN - Inshore Bottom 17/11/2018	18-17286-19 UCS - Near Top 17/11/2018	18-17286-20 UCS - Near Bottom 17/11/2018
Total Nitrogen	0.2	mg/L	<0.2	0.2	<0.2	<0.2	0.5
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	0.2	<0.2	<0.2	0.5

Total Phosphorus in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-1 Rocky Point Top 18/11/2018	18-17286-2 Rocky Point Bottom 18/11/2018	18-17286-3 Locker Point Top 18/11/2018	18-17286-4 Locker Point Bottom 18/11/2018	18-17286-5 UCS - Off Top 17/11/2018
Total Phosphorus	0.01	mg/L	0.04	0.04	0.04	0.04	0.04

Total Phosphorus in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-6 UCS - Off Bottom 17/11/2018	18-17286-7 Locker - SW Top 18/11/2018	18-17286-8 Locker - SW Bottom 18/11/2018	18-17286-9 EVA Top 17/11/2018	18-17286-10 EVA Bottom 17/11/2018
Total Phosphorus	0.01	mg/L	0.04	0.04	0.04	0.04	0.04

ARL GROUP

LABORATORY REPORT

University of WA

ARL Job No: 18-17286

Revision: 00

Date: 27 November 2018

Total Phosphorus in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-11 UCS - Inshore Top 17/11/2018	18-17286-12 UCS - Inshore Bottom 17/11/2018	18-17286-13 UCN - New Top 17/11/2018	18-17286-14 UCN - Near Bottom 17/11/2018	18-17286-15 Fly Top 17/11/2018
Total Phosphorus	0.01	mg/L	0.04	0.04	0.04	0.04	0.04

Total Phosphorus in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-16 Fly Bottom 17/11/2018	18-17286-17 NCN - Inshore Top 17/11/2018	18-17286-18 NCN - Inshore Bottom 17/11/2018	18-17286-19 UCS - Near Top 17/11/2018	18-17286-20 UCS - Near Bottom 17/11/2018
Total Phosphorus	0.01	mg/L	0.04	0.04	0.04	0.04	0.04

Ions by Discrete Analyser Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-1 Rocky Point Top 18/11/2018	18-17286-2 Rocky Point Bottom 18/11/2018	18-17286-3 Locker Point Top 18/11/2018	18-17286-4 Locker Point Bottom 18/11/2018	18-17286-5 UCS - Off Top 17/11/2018
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	<0.01	0.01	0.01	0.01	0.01
NOx-N	0.01	mg/L	<0.01	0.02	0.02	0.02	0.02
Nitrite-N	0.01	mg/L	<0.01	0.01	0.01	0.01	0.01

Ions by Discrete Analyser Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-6 UCS - Off Bottom 17/11/2018	18-17286-7 Locker - SW Top 18/11/2018	18-17286-8 Locker - SW Bottom 18/11/2018	18-17286-9 EVA Top 17/11/2018	18-17286-10 EVA Bottom 17/11/2018
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	0.02	0.01	0.01	0.01	0.02
NOx-N	0.01	mg/L	0.03	0.02	0.02	0.02	0.03
Nitrite-N	0.01	mg/L	0.01	0.01	0.01	0.01	0.01

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Ions by Discrete Analyser Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-11 UCS - Inshore Top 17/11/2018	18-17286-12 UCS - Inshore Bottom 17/11/2018	18-17286-13 UCN - New Top 17/11/2018	18-17286-14 UCN - Near Bottom 17/11/2018	18-17286-15 Fly Top 17/11/2018
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	0.01	0.01	0.01	0.01	0.01
NOx-N	0.01	mg/L	0.02	0.02	0.02	0.02	0.02
Nitrite-N	0.01	mg/L	0.01	0.01	0.01	0.01	0.01

Ions by Discrete Analyser Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-16 Fly Bottom 17/11/2018	18-17286-17 NCN - Inshore Top 17/11/2018	18-17286-18 NCN - Inshore Bottom 17/11/2018	18-17286-19 UCS - Near Top 17/11/2018	18-17286-20 UCS - Near Bottom 17/11/2018
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	0.01	0.01	0.01	0.01	<0.01
NOx-N	0.01	mg/L	0.02	0.02	0.02	0.02	<0.01
Nitrite-N	0.01	mg/L	0.01	0.01	0.01	0.01	<0.01

Physical Parameters Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-1 Rocky Point Top 18/11/2018	18-17286-2 Rocky Point Bottom 18/11/2018	18-17286-3 Locker Point Top 18/11/2018	18-17286-4 Locker Point Bottom 18/11/2018	18-17286-5 UCS - Off Top 17/11/2018
pH	0.1	pH units	8.2	8.2	8.2	8.2	8.2
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1
Conductivity	0.01	mS/cm	55	54	55	55	55
Total Dissolved Solids	5	mg/L	41,000	39,000	40,000	41,000	40,000
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5
Turbidity	0.1	NTU	2.2	2.2	1.2	1.2	1.1

Physical Parameters Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-6 UCS - Off Bottom 17/11/2018	18-17286-7 Locker - SW Top 18/11/2018	18-17286-8 Locker - SW Bottom 18/11/2018	18-17286-9 EVA Top 17/11/2018	18-17286-10 EVA Bottom 17/11/2018
pH	0.1	pH units	8.1	8.2	8.2	8.2	8.2
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1
Conductivity	0.01	mS/cm	55	54	54	54	53
Total Dissolved Solids	5	mg/L	39,000	39,000	40,000	38,000	40,000
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5
Turbidity	0.1	NTU	1.0	0.7	0.9	0.4	0.3

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Physical Parameters Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-11 UCS - Inshore Top 17/11/2018	18-17286-12 UCS - Inshore Bottom 17/11/2018	18-17286-13 UCN - New Top 17/11/2018	18-17286-14 UCN - Near Bottom 17/11/2018	18-17286-15 Fly Top 17/11/2018
pH	0.1	pH units	8.1	8.1	8.1	8.1	8.1
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1
Conductivity	0.01	mS/cm	65	64	54	55	54
Total Dissolved Solids	5	mg/L	49,000	48,000	41,000	41,000	40,000
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5
Turbidity	0.1	NTU	3.5	3.2	0.7	0.9	0.4

Physical Parameters Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-16 Fly Bottom 17/11/2018	18-17286-17 NCN - Inshore Top 17/11/2018	18-17286-18 NCN - Inshore Bottom 17/11/2018	18-17286-19 UCS - Near Top 17/11/2018	18-17286-20 UCS - Near Bottom 17/11/2018
pH	0.1	pH units	8.1	8.1	8.1	8.1	8.1
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1
Conductivity	0.01	mS/cm	54	58	58	56	56
Total Dissolved Solids	5	mg/L	38,000	42,000	42,000	42,000	41,000
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5
Turbidity	0.1	NTU	0.8	1.5	1.6	1.0	1.0

Subcontracting Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-1 Rocky Point Top 18/11/2018	18-17286-2 Rocky Point Bottom 18/11/2018	18-17286-3 Locker Point Top 18/11/2018	18-17286-4 Locker Point Bottom 18/11/2018	18-17286-5 UCS - Off Top 17/11/2018
Total Organic Carbon	1	mg/L	1	1	1	1	<1

Subcontracting Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-6 UCS - Off Bottom 17/11/2018	18-17286-7 Locker - SW Top 18/11/2018	18-17286-8 Locker - SW Bottom 18/11/2018	18-17286-9 EVA Top 17/11/2018	18-17286-10 EVA Bottom 17/11/2018
Total Organic Carbon	1	mg/L	<1	<1	<1	<1	1

Subcontracting Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-11 UCS - Inshore Top 17/11/2018	18-17286-12 UCS - Inshore Bottom 17/11/2018	18-17286-13 UCN - New Top 17/11/2018	18-17286-14 UCN - Near Bottom 17/11/2018	18-17286-15 Fly Top 17/11/2018
Total Organic Carbon	1	mg/L	2	2	1	1	<1

ARL GROUP

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Subcontracting Sample No: Sample Description: Sample Date:	LOR	UNITS	18-17286-16 Fly Bottom 17/11/2018	18-17286-17 NCN - Inshore Top 17/11/2018	18-17286-18 NCN - Inshore Bottom 17/11/2018	18-17286-19 UCS - Near Top 17/11/2018	18-17286-20 UCS - Near Bottom 17/11/2018
Total Organic Carbon	1	mg/L	<1	1	1	1	1

Result Definitions

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting

* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

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Job Number: 18-18407
Revision: 00
Date: 4 January 2019

ADDRESS: K+S Salt

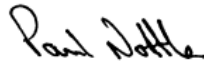



ATTENTION: Paula Cartwright

DATE RECEIVED: 10/12/2018

YOUR REFERENCE: University of WA; K+S Project

PURCHASE ORDER: K+S

APPROVALS:

			
Paul Nottle Organics Manager	Andrew Harvey Resources Manager	Douglas Todd Laboratory Manager	Sean Sangster Inorganics Supervisor

REPORT COMMENTS:

This report is issued by Analytical Reference Laboratory (WA) Pty Ltd
 Samples are analysed on an as received basis unless otherwise noted.
 Total and Dissolved Organic Carbon analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 219892

METHOD REFERENCES:

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377
 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561

Method ID	Method Description
ARL No. 007	Benzene, Toluene, Ethylbenzene and Xylenes in Water
ARL No. 005	Polycyclic Aromatic Hydrocarbons in Water
ARL No. 100	Organotins in Water
ARL No. 029	Metals in Water by AAS
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 040	Arsenic by Hydride Atomic Absorption
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids
ARL No. 016	Total Suspended Solids
ARL No. 045	Turbidity
Subcontracting	See Report Comments section for more information.
ARL No. 011	Biochemical Oxygen Demand



K+S Salt
Job No: 18-18407

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Revision: 00

Date: 4/01/19

BTEX in Water			Sample No:	18-18407-1	18-18407-2	18-18407-3	18-18407-4	18-18407-5
			Sample Details:	UCS - Off Bottom	UCN - In Top	UCN - In Bottom	UCN - Near Top	UCN - Near Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Benzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No:	18-18407-6	18-18407-7	18-18407-8	18-18407-9	18-18407-10
			Sample Details:	EVA - Is Top	EVA - Is Bottom	Fly Is Top	Fly Is Bottom	Tent Is Top
ANALYTE	LOR	Units		9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018
Benzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No:	18-18407-11	18-18407-12	18-18407-13	18-18407-14	18-18407-15
			Sample Details:	Tent Is Bottom	Rocky Point Top	Rocky Point Bottom	Locker Point top	Locker Point Bottom
ANALYTE	LOR	Units		9/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Benzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No:	18-18407-16	18-18407-17	18-18407-18	18-18407-19	18-18407-20
			Sample Details:	Locker Island Top	Locker Island Bottom	Locker SW	USC - In Top	UCS - In Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Benzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No:	18-18407-21	18-18407-22	18-18407-23
			Sample Details:	UCS - Near Top	UCS - Near Bottom	UCS - Off Top
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018
Benzene	0.001	mg/L		<0.001	<0.001	<0.001
Toluene	0.001	mg/L		<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L		<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L		<0.003	<0.003	<0.003

PAH in Water			Sample No:	18-18407-1	18-18407-2	18-18407-3	18-18407-4	18-18407-5
			Sample Details:	UCS - Off Bottom	UCN - In Top	UCN - In Bottom	UCN - Near Top	UCN - Near Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Naphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No:	18-18407-1	18-18407-2	18-18407-3	18-18407-4	18-18407-5
			Sample Details:	UCS - Off Bottom	UCN - In Top	UCN - In Bottom	UCN - Near Top	UCN - Near Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Phenanthrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No:	18-18407-6	18-18407-7	18-18407-8	18-18407-9	18-18407-10
			Sample Details:	EVA - Is Top	EVA - Is Bottom	Fly Is Top	Fly Is Bottom	Tent Is Top
ANALYTE	LOR	Units		9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018
Naphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No:	18-18407-11	18-18407-12	18-18407-13	18-18407-14	18-18407-15
			Sample Details:	Tent Is Bottom	Rocky Point Top	Rocky Point Bottom	Locker Point top	Locker Point Bottom
ANALYTE	LOR	Units		9/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Naphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No:	18-18407-11	18-18407-12	18-18407-13	18-18407-14	18-18407-15
			Sample Details:	Tent Is Bottom	Rocky Point Top	Rocky Point Bottom	Locker Point top	Locker Point Bottom
ANALYTE	LOR	Units		9/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No:	18-18407-16	18-18407-17	18-18407-18	18-18407-19	18-18407-20
			Sample Details:	Locker Island Top	Locker Island Bottom	Locker SW	USC - In Top	UCS - In Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Naphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No:	18-18407-21	18-18407-22	18-18407-23
			Sample Details:	UCS - Near Top	UCS - Near Bottom	UCS - Off Top
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018
Naphthalene	0.1	µg/L		<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L		<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L		<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L		<0.1	<0.1	<0.1
Fluorene	0.1	µg/L		<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L		<0.1	<0.1	<0.1
Anthracene	0.1	µg/L		<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1

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PAH in Water			Sample No:	18-18407-21	18-18407-22	18-18407-23
			Sample Details:	UCS - Near Top	UCS - Near Bottom	UCS - Off Top
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1

Organotins in Water			Sample No:	18-18407-1	18-18407-2	18-18407-3	18-18407-4	18-18407-5
			Sample Details:	UCS - Off Bottom	UCN - In Top	UCN - In Bottom	UCN - Near Top	UCN - Near Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Monobutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L		<2	<2	<2	<2	<2

Organotins in Water			Sample No:	18-18407-6	18-18407-7	18-18407-8	18-18407-9	18-18407-10
			Sample Details:	EVA - Is Top	EVA - Is Bottom	Fly Is Top	Fly Is Bottom	Tent Is Top
ANALYTE	LOR	Units		9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018
Monobutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L		<2	<2	<2	<2	<2

Organotins in Water			Sample No:	18-18407-11	18-18407-12	18-18407-13	18-18407-14	18-18407-15
			Sample Details:	Tent Is Bottom	Rocky Point Top	Rocky Point Bottom	Locker Point top	Locker Point Bottom
ANALYTE	LOR	Units		9/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Monobutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L		<2	<2	<2	<2	<2

Organotins in Water			Sample No:	18-18407-16	18-18407-17	18-18407-18	18-18407-19	18-18407-20
			Sample Details:	Locker Island Top	Locker Island Bottom	Locker SW	USC - In Top	UCS - In Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Monobutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L		<2	<2	<2	<2	<2

Organotins in Water			Sample No:	18-18407-21	18-18407-22	18-18407-23
			Sample Details:	UCS - Near Top	UCS - Near Bottom	UCS - Off Top
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018
Monobutyl tin	5	ngSn/L		<5	<5	<5
Dibutyl tin	5	ngSn/L		<5	<5	<5
Tributyl tin	2	ngSn/L		<2	<2	<2

Metals in Water			Sample No:	18-18407-1	18-18407-2	18-18407-3	18-18407-4	18-18407-5
			Sample Details:	UCS - Off Bottom	UCN - In Top	UCN - In Bottom	UCN - Near Top	UCN - Near Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Calcium - Dissolved	0.1	mg/L		690	650	670	670	670
Calcium - Total	0.1	mg/L		690	670	680	680	680
Magnesium - Dissolved	0.1	mg/L		1,600	1,600	1,600	1,500	1,500
Magnesium - Total	0.1	mg/L		1,600	1,600	1,600	1,600	1,500
Potassium - Dissolved	0.1	mg/L		500	500	500	490	490

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Metals in Water			Sample No:	18-18407-1	18-18407-2	18-18407-3	18-18407-4	18-18407-5
			Sample Details:	UCS - Off Bottom 8/12/2018	UCN - In Top 8/12/2018	UCN - In Bottom 8/12/2018	UCN - Near Top 8/12/2018	UCN - Near Bottom 8/12/2018
ANALYTE	LOR	Units						
Potassium - Total	0.1	mg/L		510	500	490	500	500
Aluminium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L		0.02	0.03	0.01	<0.01	<0.01
Manganese - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L		0.009	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L		0.009	<0.005	<0.005	0.008	<0.005
Arsenic - Dissolved	0.001	mg/L		0.002	0.002	0.002	0.002	0.002
Arsenic - Total	0.001	mg/L		0.002	0.002	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L		9,600	9,700	9,600	9,500	9,600
Sodium - Total	0.1	mg/L		10,000	10,000	10,000	10,000	10,000

Metals in Water			Sample No:	18-18407-6	18-18407-7	18-18407-8	18-18407-9	18-18407-10
			Sample Details:	EVA - Is Top 9/12/2018	EVA - Is Bottom 9/12/2018	Fly Is Top 9/12/2018	Fly Is Bottom 9/12/2018	Tent Is Top 9/12/2018
ANALYTE	LOR	Units						
Calcium - Dissolved	0.1	mg/L		650	650	640	640	690
Calcium - Total	0.1	mg/L		650	650	650	650	690
Magnesium - Dissolved	0.1	mg/L		1,500	1,500	1,500	1,500	1,700
Magnesium - Total	0.1	mg/L		1,500	1,500	1,600	1,500	1,600
Potassium - Dissolved	0.1	mg/L		470	470	480	460	510
Potassium - Total	0.1	mg/L		470	480	490	480	550
Aluminium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L		0.01	<0.01	<0.01	<0.01	0.01
Manganese - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

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Metals in Water			Sample No:	18-18407-6	18-18407-7	18-18407-8	18-18407-9	18-18407-10
			Sample Details:	EVA - Is Top	EVA - Is Bottom	Fly Is Top	Fly Is Bottom	Tent Is Top
ANALYTE	LOR	Units		9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018
Vanadium - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L		0.009	<0.005	0.010	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L		0.002	0.002	0.002	0.002	0.002
Arsenic - Total	0.001	mg/L		0.002	0.002	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L		9,600	9,600	9,500	9,400	9,700
Sodium - Total	0.1	mg/L		10,000	10,000	10,000	10,000	10,000

Metals in Water			Sample No:	18-18407-11	18-18407-12	18-18407-13	18-18407-14	18-18407-15
			Sample Details:	Tent Is Bottom	Rocky Point Top	Rocky Point Bottom	Locker Point top	Locker Point Bottom
ANALYTE	LOR	Units		9/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Calcium - Dissolved	0.1	mg/L		610	610	640	620	560
Calcium - Total	0.1	mg/L		640	620	660	630	610
Magnesium - Dissolved	0.1	mg/L		1,500	1,400	1,500	1,600	1,200
Magnesium - Total	0.1	mg/L		1,500	1,400	1,500	1,600	1,500
Potassium - Dissolved	0.1	mg/L		460	450	470	500	380
Potassium - Total	0.1	mg/L		490	480	500	500	480
Aluminium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L		<0.01	<0.01	0.02	0.02	0.03
Manganese - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L		0.007	0.006	<0.005	<0.005	0.010
Zinc - Total	0.005	mg/L		0.011	0.006	<0.005	<0.005	0.010
Arsenic - Dissolved	0.001	mg/L		0.002	0.002	0.002	0.002	0.002
Arsenic - Total	0.001	mg/L		0.002	0.002	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001

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Metals in Water			Sample No:	18-18407-11	18-18407-12	18-18407-13	18-18407-14	18-18407-15
			Sample Details:	Tent Is Bottom	Rocky Point Top	Rocky Point Bottom	Locker Point top	Locker Point Bottom
ANALYTE	LOR	Units		9/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Cobalt - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L		9,600	9,500	9,500	9,500	9,600
Sodium - Total	0.1	mg/L		10,000	10,000	10,000	10,000	10,000

Metals in Water			Sample No:	18-18407-16	18-18407-17	18-18407-18	18-18407-19	18-18407-20
			Sample Details:	Locker Island Top	Locker Island Bottom	Locker SW	USC - In Top	UCS - In Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Calcium - Dissolved	0.1	mg/L		570	570	<0.1	620	600
Calcium - Total	0.1	mg/L		610	640	<0.1	690	690
Magnesium - Dissolved	0.1	mg/L		1,200	1,300	<0.1	1,400	1,400
Magnesium - Total	0.1	mg/L		1,200	1,300	<0.1	1,400	1,400
Potassium - Dissolved	0.1	mg/L		410	410	<0.1	450	440
Potassium - Total	0.1	mg/L		450	480	<0.1	550	540
Aluminium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	0.05
Manganese - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L		<0.005	<0.005	0.32	<0.005	<0.005
Zinc - Total	0.005	mg/L		0.008	<0.005	0.32	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L		0.002	0.002	<0.001	0.002	0.002
Arsenic - Total	0.001	mg/L		0.002	0.002	<0.001	0.002	0.002
Chromium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L		<0.001	<0.001	0.011	<0.001	<0.001
Copper - Total	0.001	mg/L		<0.001	<0.001	0.012	<0.001	<0.001
Lead - Dissolved	0.001	mg/L		<0.001	<0.001	0.005	<0.001	<0.001
Lead - Total	0.001	mg/L		<0.001	<0.001	0.006	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L		<0.001	<0.001	0.033	<0.001	<0.001
Nickel - Total	0.001	mg/L		<0.001	<0.001	0.033	<0.001	<0.001

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Metals in Water			Sample No:	18-18407-16	18-18407-17	18-18407-18	18-18407-19	18-18407-20
			Sample Details:	Locker Island Top	Locker Island Bottom	Locker SW	USC - In Top	UCS - In Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Cadmium - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L		9,400	9,700	<0.1	9,500	9,500
Sodium - Total	0.1	mg/L		10,000	10,000	<0.1	10,000	10,000

Metals in Water			Sample No:	18-18407-21	18-18407-22	18-18407-23
			Sample Details:	UCS - Near Top	UCS - Near Bottom	UCS - Off Top
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018
Calcium - Dissolved	0.1	mg/L		620	660	640
Calcium - Total	0.1	mg/L		660	660	640
Magnesium - Dissolved	0.1	mg/L		1,400	1,500	1,500
Magnesium - Total	0.1	mg/L		1,400	1,500	1,500
Potassium - Dissolved	0.1	mg/L		460	470	480
Potassium - Total	0.1	mg/L		480	490	480
Aluminium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L		0.02	<0.01	<0.01
Manganese - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L		<0.01	<0.01	<0.01
Tin - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001
Tin - Total	0.001	mg/L		<0.001	<0.001	<0.001
Vanadium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L		<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L		<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L		0.005	0.008	0.016
Arsenic - Dissolved	0.001	mg/L		0.002	0.002	0.003
Arsenic - Total	0.001	mg/L		0.003	0.002	0.003
Chromium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L		<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L		<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L		<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L		<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L		<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L		<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L		9,600	9,500	9,500

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Metals in Water			Sample No:	18-18407-21	18-18407-22	18-18407-23
			Sample Details:	UCS - Near Top	UCS - Near Bottom	UCS - Off Top
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018
Sodium - Total	0.1	mg/L		10,000	10,000	10,000

Total Nitrogen in Water			Sample No:	18-18407-1	18-18407-2	18-18407-3	18-18407-4	18-18407-5
			Sample Details:	UCS - Off Bottom	UCN - In Top	UCN - In Bottom	UCN - Near Top	UCN - Near Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Total Nitrogen	0.2	mg/L		0.2	0.3	0.3	0.4	0.3
Total Kjeldahl Nitrogen	0.2	mg/L		0.2	0.3	0.3	0.4	0.3

Total Nitrogen in Water			Sample No:	18-18407-6	18-18407-7	18-18407-8	18-18407-9	18-18407-10
			Sample Details:	EVA - Is Top	EVA - Is Bottom	Fly Is Top	Fly Is Bottom	Tent Is Top
ANALYTE	LOR	Units		9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018
Total Nitrogen	0.2	mg/L		0.4	0.3	0.5	0.6	0.4
Total Kjeldahl Nitrogen	0.2	mg/L		0.4	0.3	0.5	0.6	0.4

Total Nitrogen in Water			Sample No:	18-18407-11	18-18407-12	18-18407-13	18-18407-14	18-18407-15
			Sample Details:	Tent Is Bottom	Rocky Point Top	Rocky Point Bottom	Locker Point top	Locker Point Bottom
ANALYTE	LOR	Units		9/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Total Nitrogen	0.2	mg/L		0.5	0.3	0.4	0.3	0.5
Total Kjeldahl Nitrogen	0.2	mg/L		0.5	0.3	0.4	0.3	0.5

Total Nitrogen in Water			Sample No:	18-18407-16	18-18407-17	18-18407-18	18-18407-19	18-18407-20
			Sample Details:	Locker Island Top	Locker Island Bottom	Locker SW	USC - In Top	UCS - In Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Total Nitrogen	0.2	mg/L		0.3	0.3	<0.2	0.5	0.4
Total Kjeldahl Nitrogen	0.2	mg/L		0.3	0.3	<0.2	0.5	0.4

Total Nitrogen in Water			Sample No:	18-18407-21	18-18407-22	18-18407-23
			Sample Details:	UCS - Near Top	UCS - Near Bottom	UCS - Off Top
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018
Total Nitrogen	0.2	mg/L		0.4	0.5	0.5
Total Kjeldahl Nitrogen	0.2	mg/L		0.4	0.5	0.5

Total Phosphorus in Water			Sample No:	18-18407-1	18-18407-2	18-18407-3	18-18407-4	18-18407-5
			Sample Details:	UCS - Off Bottom	UCN - In Top	UCN - In Bottom	UCN - Near Top	UCN - Near Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Total Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No:	18-18407-6	18-18407-7	18-18407-8	18-18407-9	18-18407-10
			Sample Details:	EVA - Is Top	EVA - Is Bottom	Fly Is Top	Fly Is Bottom	Tent Is Top
ANALYTE	LOR	Units		9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018
Total Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

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Total Phosphorus in Water			Sample No:	18-18407-11	18-18407-12	18-18407-13	18-18407-14	18-18407-15
			Sample Details:	Tent Is Bottom	Rocky Point Top	Rocky Point Bottom	Locker Point top	Locker Point Bottom
ANALYTE	LOR	Units		9/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Total Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No:	18-18407-16	18-18407-17	18-18407-18	18-18407-19	18-18407-20
			Sample Details:	Locker Island Top	Locker Island Bottom	Locker SW	USC - In Top	UCS - In Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Total Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No:	18-18407-21	18-18407-22	18-18407-23
			Sample Details:	UCS - Near Top	UCS - Near Bottom	UCS - Off Top
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018
Total Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No:	18-18407-1	18-18407-2	18-18407-3	18-18407-4	18-18407-5
			Sample Details:	UCS - Off Bottom	UCN - In Top	UCN - In Bottom	UCN - Near Top	UCN - Near Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Bromide	0.1	mg/L		77	70	79	79	76
Chloride	5	mg/L		20,000	19,000	20,000	20,000	20,000
Sulfate	1	mg/L		3,300	3,100	3,300	3,300	3,300
Filterable Reactive Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No:	18-18407-6	18-18407-7	18-18407-8	18-18407-9	18-18407-10
			Sample Details:	EVA - Is Top	EVA - Is Bottom	Fly Is Top	Fly Is Bottom	Tent Is Top
ANALYTE	LOR	Units		9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018
Bromide	0.1	mg/L		69	65	64	72	85
Chloride	5	mg/L		19,000	19,000	18,000	19,000	21,000
Sulfate	1	mg/L		3,200	3,200	3,200	3,200	3,600
Filterable Reactive Phosphorus	0.01	mg/L		0.02	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	0.03
NOx-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	0.03
Nitrite-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No:	18-18407-11	18-18407-12	18-18407-13	18-18407-14	18-18407-15
			Sample Details:	Tent Is Bottom	Rocky Point Top	Rocky Point Bottom	Locker Point top	Locker Point Bottom
ANALYTE	LOR	Units		9/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Bromide	0.1	mg/L		81	75	80	80	69
Chloride	5	mg/L		19,000	19,000	20,000	18,000	19,000
Sulfate	1	mg/L		3,100	3,200	3,200	3,200	3,300
Filterable Reactive Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02

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Ions by Discrete Analyser			Sample No:	18-18407-11	18-18407-12	18-18407-13	18-18407-14	18-18407-15
			Sample Details:	Tent Is Bottom	Rocky Point Top	Rocky Point Bottom	Locker Point top	Locker Point Bottom
ANALYTE	LOR	Units		9/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Nitrate-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No:	18-18407-16	18-18407-17	18-18407-18	18-18407-19	18-18407-20
			Sample Details:	Locker Island Top	Locker Island Bottom	Locker SW	USC - In Top	UCS - In Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Bromide	0.1	mg/L		70	87	<0.1	94	84
Chloride	5	mg/L		18,000	18,000	<5	21,000	20,000
Sulfate	1	mg/L		3,200	3,300	<1	3,600	3,600
Filterable Reactive Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No:	18-18407-21	18-18407-22	18-18407-23
			Sample Details:	UCS - Near Top	UCS - Near Bottom	UCS - Off Top
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018
Bromide	0.1	mg/L		77	81	86
Chloride	5	mg/L		19,000	19,000	19,000
Sulfate	1	mg/L		3,400	3,400	3,400
Filterable Reactive Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L		<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L		<0.01	<0.01	<0.01
NOx-N	0.01	mg/L		<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L		<0.01	<0.01	<0.01

Physical Parameters			Sample No:	18-18407-1	18-18407-2	18-18407-3	18-18407-4	18-18407-5
			Sample Details:	UCS - Off Bottom	UCN - In Top	UCN - In Bottom	UCN - Near Top	UCN - Near Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
pH	0.1	pH units		8.1	8.2	8.2	8.2	8.2
Conductivity	0.01	mS/cm		52	52	52	52	52
Total Dissolved Solids	5	mg/L		35,000	34,000	35,000	35,000	36,000
Total Suspended Solids	5	mg/L		<5	6	<5	<5	<5
Turbidity	0.1	NTU		1.7	1.3	1.2	1.4	1.1

Physical Parameters			Sample No:	18-18407-6	18-18407-7	18-18407-8	18-18407-9	18-18407-10
			Sample Details:	EVA - Is Top	EVA - Is Bottom	Fly Is Top	Fly Is Bottom	Tent Is Top
ANALYTE	LOR	Units		9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018
pH	0.1	pH units		8.2	8.2	8.2	8.2	8.2
Conductivity	0.01	mS/cm		50	50	50	50	55
Total Dissolved Solids	5	mg/L		34,000	34,000	34,000	35,000	37,000
Total Suspended Solids	5	mg/L		<5	<5	<5	<5	11
Turbidity	0.1	NTU		0.9	0.4	1.0	1.0	3.0

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Physical Parameters			Sample No:	18-18407-11	18-18407-12	18-18407-13	18-18407-14	18-18407-15
			Sample Details:	Tent Is Bottom	Rocky Point Top	Rocky Point Bottom	Locker Point top	Locker Point Bottom
ANALYTE	LOR	Units		9/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
pH	0.1	pH units		8.2	8.2	8.1	8.1	8.2
Conductivity	0.01	mS/cm		51	51	51	50	51
Total Dissolved Solids	5	mg/L		35,000	36,000	36,000	36,000	37,000
Total Suspended Solids	5	mg/L		<5	<5	<5	<5	<5
Turbidity	0.1	NTU		1.7	1.7	2.0	0.9	1.6

Physical Parameters			Sample No:	18-18407-16	18-18407-17	18-18407-18	18-18407-19	18-18407-20
			Sample Details:	Locker Island Top	Locker Island Bottom	Locker SW	USC - In Top	UCS - In Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
pH	0.1	pH units		8.2	8.2	6.4	8.2	8.2
Conductivity	0.01	mS/cm		50	49	<0.01	55	55
Total Dissolved Solids	5	mg/L		34,000	34,000	<5	36,000	37,000
Total Suspended Solids	5	mg/L		<5	<5	<5	<5	<5
Turbidity	0.1	NTU		0.6	1.0	0.1	1.3	3.1

Physical Parameters			Sample No:	18-18407-21	18-18407-22	18-18407-23
			Sample Details:	UCS - Near Top	UCS - Near Bottom	UCS - Off Top
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018
pH	0.1	pH units		8.3	8.3	8.2
Conductivity	0.01	mS/cm		52	51	51
Total Dissolved Solids	5	mg/L		35,000	36,000	34,000
Total Suspended Solids	5	mg/L		110	<5	<5
Turbidity	0.1	NTU		0.9	0.8	0.8

Subcontracting			Sample No:	18-18407-1	18-18407-2	18-18407-3	18-18407-4	18-18407-5
			Sample Details:	UCS - Off Bottom	UCN - In Top	UCN - In Bottom	UCN - Near Top	UCN - Near Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Total Organic Carbon	1	mg/L		2	2	2	2	2
Dissolved Organic Carbon	1	mg/L		2	1	2	1	1

Subcontracting			Sample No:	18-18407-6	18-18407-7	18-18407-8	18-18407-9	18-18407-10
			Sample Details:	EVA - Is Top	EVA - Is Bottom	Fly Is Top	Fly Is Bottom	Tent Is Top
ANALYTE	LOR	Units		9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018
Total Organic Carbon	1	mg/L		1	1	1	1	2
Dissolved Organic Carbon	1	mg/L		1	1	1	1	2

Subcontracting			Sample No:	18-18407-11	18-18407-12	18-18407-13	18-18407-14	18-18407-15
			Sample Details:	Tent Is Bottom	Rocky Point Top	Rocky Point Bottom	Locker Point top	Locker Point Bottom
ANALYTE	LOR	Units		9/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Total Organic Carbon	1	mg/L		1	1	1	1	1
Dissolved Organic Carbon	1	mg/L		1	1	1	1	1

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Subcontracting			Sample No:	18-18407-16	18-18407-17	18-18407-18	18-18407-19	18-18407-20
			Sample Details:	Locker Island Top	Locker Island Bottom	Locker SW	USC - In Top	UCS - In Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Total Organic Carbon	1	mg/L		1	1	<1	2	2
Dissolved Organic Carbon	1	mg/L		1	1	<1	2	2

Subcontracting			Sample No:	18-18407-21	18-18407-22	18-18407-23
			Sample Details:	UCS - Near Top	UCS - Near Bottom	UCS - Off Top
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018
Total Organic Carbon	1	mg/L		2	2	2
Dissolved Organic Carbon	1	mg/L		1	1	1

Biochemical Oxygen Demand			Sample No:	18-18407-1	18-18407-2	18-18407-3	18-18407-4	18-18407-5
			Sample Details:	UCS - Off Bottom	UCN - In Top	UCN - In Bottom	UCN - Near Top	UCN - Near Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Biochemical Oxygen Demand	5	mg/L		<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No:	18-18407-6	18-18407-7	18-18407-8	18-18407-9	18-18407-10
			Sample Details:	EVA - Is Top	EVA - Is Bottom	Fly Is Top	Fly Is Bottom	Tent Is Top
ANALYTE	LOR	Units		9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018
Biochemical Oxygen Demand	5	mg/L		<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No:	18-18407-11	18-18407-12	18-18407-13	18-18407-14	18-18407-15
			Sample Details:	Tent Is Bottom	Rocky Point Top	Rocky Point Bottom	Locker Point top	Locker Point Bottom
ANALYTE	LOR	Units		9/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Biochemical Oxygen Demand	5	mg/L		<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No:	18-18407-16	18-18407-17	18-18407-18	18-18407-19	18-18407-20
			Sample Details:	Locker Island Top	Locker Island Bottom	Locker SW	USC - In Top	UCS - In Bottom
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018	8/12/2018	8/12/2018
Biochemical Oxygen Demand	5	mg/L		<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No:	18-18407-21	18-18407-22	18-18407-23
			Sample Details:	UCS - Near Top	UCS - Near Bottom	UCS - Off Top
ANALYTE	LOR	Units		8/12/2018	8/12/2018	8/12/2018
Biochemical Oxygen Demand	5	mg/L		<5	<5	<5

Result Definitions

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting
* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should

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be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

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ADDRESS: K+S Salt

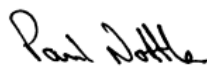
ATTENTION: Paula Cartwright

DATE RECEIVED: 11/01/2019

YOUR REFERENCE: University of WA; K+S Project

PURCHASE ORDER: K+S

APPROVALS:



Paul Nottle
Organics Manager



Min How
Organics Supervisor



Douglas Todd
Laboratory Manager



Sam Becker
Inorganics Manager



Sean Sangster
Inorganics Supervisor

REPORT COMMENTS:

This report is issued by Analytical Reference Laboratory (WA) Pty Ltd
 Samples are analysed on an as received basis unless otherwise noted.
 Total and Dissolved Organic Carbon analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 221037

METHOD REFERENCES:

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377
 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561

Method ID	Method Description
ARL No. 007	Benzene, Toluene, Ethylbenzene and Xylenes in Water
ARL No. 005	Polycyclic Aromatic Hydrocarbons in Water
ARL No. 100	Organotins in Water
ARL No. 029	Metals in Water by AAS
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 040	Arsenic by Hydride Atomic Absorption
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids
ARL No. 016	Total Suspended Solids
ARL No. 045	Turbidity
ARL No. 141	Chlorophyll-a and Pheophytin-a in Water
Subcontracting	See Report Comments section for more information.



**WORLD RECOGNISED
ACCREDITATION**
 Accredited for compliance with
 ISO/IEC 17025 - Testing

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Method ID	Method Description
ARL No. 011	Biochemical Oxygen Demand

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BTEX in Water			Sample No:	19-00564-1	19-00564-2	19-00564-3	19-00564-4	19-00564-5
			Sample Details:	Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Benzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No:	19-00564-6	19-00564-7	19-00564-8	19-00564-9	19-00564-10
			Sample Details:	Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Benzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No:	19-00564-11	19-00564-12	19-00564-13	19-00564-14	19-00564-15
			Sample Details:	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Near Top	Urala Creek South Near Bottom	Urala Creek South Off Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Benzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No:	19-00564-16	19-00564-17	19-00564-18	19-00564-19	19-00564-20
			Sample Details:	Urala Creek South Off Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Benzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No:	19-00564-21	19-00564-22	19-00564-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
Benzene	0.001	mg/L		<0.001	<0.001	<0.001
Toluene	0.001	mg/L		<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L		<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L		<0.003	<0.003	<0.003

PAH in Water			Sample No:	19-00564-1	19-00564-2	19-00564-3	19-00564-4	19-00564-5
			Sample Details:	Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Naphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No:	19-00564-1	19-00564-2	19-00564-3	19-00564-4	19-00564-5
			Sample Details:	Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Acenaphthylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No:	19-00564-6	19-00564-7	19-00564-8	19-00564-9	19-00564-10
			Sample Details:	Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Naphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No:	19-00564-11	19-00564-12	19-00564-13	19-00564-14	19-00564-15
			Sample Details:	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Near Top	Urala Creek South Near Bottom	Urala Creek South Off Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Naphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No:	19-00564-11	19-00564-12	19-00564-13	19-00564-14	19-00564-15
			Sample Details:	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Near Top	Urala Creek South Near Bottom	Urala Creek South Off Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Phenanthrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No:	19-00564-16	19-00564-17	19-00564-18	19-00564-19	19-00564-20
			Sample Details:	Urala Creek South Off Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Naphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No:	19-00564-21	19-00564-22	19-00564-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
Naphthalene	0.1	µg/L		<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L		<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L		<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L		<0.1	<0.1	<0.1
Fluorene	0.1	µg/L		<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L		<0.1	<0.1	<0.1
Anthracene	0.1	µg/L		<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1

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PAH in Water			Sample No:	19-00564-21	19-00564-22	19-00564-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1

Organotins in Water			Sample No:	19-00564-1	19-00564-2	19-00564-3	19-00564-4	19-00564-5
			Sample Details:	Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Monobutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L		<2	<2	<2	<2	<2

Organotins in Water			Sample No:	19-00564-6	19-00564-7	19-00564-8	19-00564-9	19-00564-10
			Sample Details:	Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Monobutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L		<2	<2	<2	<2	<2

Organotins in Water			Sample No:	19-00564-11	19-00564-12	19-00564-13	19-00564-14	19-00564-15
			Sample Details:	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Near Top	Urala Creek South Near Bottom	Urala Creek South Off Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Monobutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L		<2	<2	<2	<2	<2

Organotins in Water			Sample No:	19-00564-16	19-00564-17	19-00564-18	19-00564-19	19-00564-20
			Sample Details:	Urala Creek South Off Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Monobutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L		<2	<2	<2	<2	<2

Organotins in Water			Sample No:	19-00564-21	19-00564-22	19-00564-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
Monobutyl tin	5	ngSn/L		18	<5	<5
Dibutyl tin	5	ngSn/L		<5	<5	<5

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Organotins in Water			Sample No: 19-00564-21	19-00564-22	19-00564-23
			Sample Details: Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019
Tributyl tin	2	ngSn/L	<2	<2	<2

Metals in Water			Sample No: 19-00564-1	19-00564-2	19-00564-3	19-00564-4	19-00564-5
			Sample Details: Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Calcium - Dissolved	0.1	mg/L	430	460	450	450	460
Calcium - Total	0.1	mg/L	460	460	450	450	460
Magnesium - Dissolved	0.1	mg/L	1,300	1,400	1,300	1,400	1,400
Magnesium - Total	0.1	mg/L	1,500	1,500	1,400	1,400	1,500
Potassium - Dissolved	0.1	mg/L	410	450	430	410	410
Potassium - Total	0.1	mg/L	450	450	430	430	450
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	0.02	0.05	0.02	<0.01	0.04
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Tin - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L	0.006	0.009	<0.005	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L	0.001	0.001	0.001	0.001	0.001
Arsenic - Total	0.001	mg/L	0.002	0.001	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L	12,000	13,000	12,000	12,000	12,000
Sodium - Total	0.1	mg/L	12,000	13,000	12,000	12,000	12,000

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Metals in Water			Sample No:	19-00564-6	19-00564-7	19-00564-8	19-00564-9	19-00564-10
			Sample Details:	Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Calcium - Dissolved	0.1	mg/L		470	460	480	460	470
Calcium - Total	0.1	mg/L		470	460	500	460	470
Magnesium - Dissolved	0.1	mg/L		1,400	1,400	1,400	1,400	1,400
Magnesium - Total	0.1	mg/L		1,400	1,500	1,600	1,500	1,400
Potassium - Dissolved	0.1	mg/L		410	410	400	420	410
Potassium - Total	0.1	mg/L		440	450	500	430	480
Aluminium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L		0.09	0.06	<0.01	<0.01	<0.01
Manganese - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	0.015
Zinc - Total	0.005	mg/L		0.006	<0.005	<0.005	0.007	0.016
Arsenic - Dissolved	0.001	mg/L		0.001	0.001	0.001	0.001	0.001
Arsenic - Total	0.001	mg/L		0.002	0.002	0.001	0.002	0.001
Chromium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L		0.001	0.002	<0.001	<0.001	0.001
Lead - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L		12,000	12,000	12,000	12,000	12,000
Sodium - Total	0.1	mg/L		12,000	12,000	12,000	12,000	13,000

Metals in Water			Sample No:	19-00564-11	19-00564-12	19-00564-13	19-00564-14	19-00564-15
			Sample Details:	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Near Top	Urala Creek South Near Bottom	Urala Creek South Off Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Calcium - Dissolved	0.1	mg/L		500	510	500	490	460
Calcium - Total	0.1	mg/L		500	510	500	490	480
Magnesium - Dissolved	0.1	mg/L		1,500	1,400	1,500	1,400	1,400
Magnesium - Total	0.1	mg/L		1,600	1,500	1,600	1,500	1,400
Potassium - Dissolved	0.1	mg/L		440	440	430	440	410
Potassium - Total	0.1	mg/L		460	470	450	440	430

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Metals in Water			Sample No:	19-00564-11	19-00564-12	19-00564-13	19-00564-14	19-00564-15
			Sample Details:	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Near Top	Urala Creek South Near Bottom	Urala Creek South Off Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Aluminium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	0.04
Manganese - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L		0.006	<0.005	0.012	0.011	0.018
Zinc - Total	0.005	mg/L		0.007	<0.005	0.015	0.015	0.022
Arsenic - Dissolved	0.001	mg/L		0.001	0.001	0.001	0.001	0.001
Arsenic - Total	0.001	mg/L		0.001	0.001	0.001	0.001	0.002
Chromium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L		<0.001	<0.001	0.001	0.001	0.001
Copper - Total	0.001	mg/L		0.001	<0.001	0.002	0.003	0.002
Lead - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L		13,000	12,000	13,000	12,000	12,000
Sodium - Total	0.1	mg/L		13,000	13,000	13,000	12,000	12,000

Metals in Water			Sample No:	19-00564-16	19-00564-17	19-00564-18	19-00564-19	19-00564-20
			Sample Details:	Urala Creek South Off Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Calcium - Dissolved	0.1	mg/L		470	480	440	440	440
Calcium - Total	0.1	mg/L		470	480	470	470	460
Magnesium - Dissolved	0.1	mg/L		1,400	1,300	1,300	1,300	1,400
Magnesium - Total	0.1	mg/L		1,500	1,500	1,400	1,300	1,400
Potassium - Dissolved	0.1	mg/L		410	400	400	410	410
Potassium - Total	0.1	mg/L		420	440	410	410	420
Aluminium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001

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Metals in Water			Sample No:	19-00564-16	19-00564-17	19-00564-18	19-00564-19	19-00564-20
			Sample Details:	Urala Creek South Off Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Vanadium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L		0.016	<0.005	0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L		0.017	<0.005	0.007	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L		0.001	0.002	0.002	0.002	0.001
Arsenic - Total	0.001	mg/L		0.002	0.002	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L		0.002	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L		0.003	0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L		<0.001	<0.001	0.004	<0.001	<0.001
Nickel - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L		12,000	12,000	12,000	12,000	11,000
Sodium - Total	0.1	mg/L		12,000	12,000	12,000	12,000	11,000

Metals in Water			Sample No:	19-00564-21	19-00564-22	19-00564-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
Calcium - Dissolved	0.1	mg/L		430	430	25
Calcium - Total	0.1	mg/L		460	470	32
Magnesium - Dissolved	0.1	mg/L		1,300	1,300	8.9
Magnesium - Total	0.1	mg/L		1,300	1,300	9.3
Potassium - Dissolved	0.1	mg/L		400	410	4.7
Potassium - Total	0.1	mg/L		410	410	5.6
Aluminium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L		<0.01	<0.01	<0.01
Manganese - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L		<0.01	<0.01	<0.01
Tin - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001
Tin - Total	0.001	mg/L		<0.001	<0.001	<0.001
Vanadium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L		<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L		<0.005	<0.005	0.033
Zinc - Total	0.005	mg/L		<0.005	0.005	0.033
Arsenic - Dissolved	0.001	mg/L		0.002	0.002	<0.001
Arsenic - Total	0.001	mg/L		0.002	0.002	<0.001

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			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
Chromium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L		<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L		<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L		0.001	0.001	0.001
Lead - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L		<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L		<0.001	<0.001	0.001
Nickel - Total	0.001	mg/L		<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L		<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L		11,000	11,000	120
Sodium - Total	0.1	mg/L		11,000	11,000	130

Total Nitrogen in Water			Sample No:	19-00564-1	19-00564-2	19-00564-3	19-00564-4	19-00564-5
			Sample Details:	Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Nitrogen	0.2	mg/L		1.0	1.2	1.1	0.9	0.8
Total Kjeldahl Nitrogen	0.2	mg/L		1.0	1.2	1.1	0.9	0.8

Total Nitrogen in Water			Sample No:	19-00564-6	19-00564-7	19-00564-8	19-00564-9	19-00564-10
			Sample Details:	Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Nitrogen	0.2	mg/L		0.7	1.0	0.6	0.7	0.8
Total Kjeldahl Nitrogen	0.2	mg/L		0.7	1.0	0.6	0.7	0.8

Total Nitrogen in Water			Sample No:	19-00564-11	19-00564-12	19-00564-13	19-00564-14	19-00564-15
			Sample Details:	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Near Top	Urala Creek South Near Bottom	Urala Creek South Off Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Nitrogen	0.2	mg/L		0.9	1.1	1.0	0.8	1.1
Total Kjeldahl Nitrogen	0.2	mg/L		0.9	1.1	1.0	0.8	1.1

Total Nitrogen in Water			Sample No:	19-00564-16	19-00564-17	19-00564-18	19-00564-19	19-00564-20
			Sample Details:	Urala Creek South Off Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Nitrogen	0.2	mg/L		2.4	0.7	0.7	0.8	1.3
Total Kjeldahl Nitrogen	0.2	mg/L		2.4	0.7	0.7	0.8	1.3

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Total Nitrogen in Water			Sample No:	19-00564-21	19-00564-22	19-00564-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
Total Nitrogen	0.2	mg/L		0.5	1.4	0.3
Total Kjeldahl Nitrogen	0.2	mg/L		0.5	1.4	<0.2

Total Phosphorus in Water			Sample No:	19-00564-1	19-00564-2	19-00564-3	19-00564-4	19-00564-5
			Sample Details:	Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Phosphorus	0.01	mg/L		0.01	0.02	0.01	0.02	0.01

Total Phosphorus in Water			Sample No:	19-00564-6	19-00564-7	19-00564-8	19-00564-9	19-00564-10
			Sample Details:	Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Phosphorus	0.01	mg/L		0.02	0.02	0.07	<0.01	<0.01

Total Phosphorus in Water			Sample No:	19-00564-11	19-00564-12	19-00564-13	19-00564-14	19-00564-15
			Sample Details:	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Near Top	Urala Creek South Near Bottom	Urala Creek South Off Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No:	19-00564-16	19-00564-17	19-00564-18	19-00564-19	19-00564-20
			Sample Details:	Urala Creek South Off Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Phosphorus	0.01	mg/L		<0.01	<0.01	0.01	<0.01	0.01

Total Phosphorus in Water			Sample No:	19-00564-21	19-00564-22	19-00564-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
Total Phosphorus	0.01	mg/L		<0.01	<0.01	0.17

Ions by Discrete Analyser			Sample No:	19-00564-1	19-00564-2	19-00564-3	19-00564-4	19-00564-5
			Sample Details:	Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Bromide	0.1	mg/L		74	95	69	79	76
Chloride	5	mg/L		21,000	22,000	20,000	22,000	23,000
Sulfate	1	mg/L		3,000	3,100	3,000	2,900	3,000
Filterable Reactive Phosphorus	0.01	mg/L		0.02	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L		0.10	0.06	0.04	<0.02	0.03
Nitrate-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

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Ions by Discrete Analyser			Sample No:	19-00564-6	19-00564-7	19-00564-8	19-00564-9	19-00564-10
			Sample Details:	Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Bromide	0.1	mg/L		79	68	63	86	56
Chloride	5	mg/L		24,000	25,000	25,000	21,000	23,000
Sulfate	1	mg/L		3,100	3,200	3,000	2,900	3,000
Filterable Reactive Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L		0.04	0.07	0.05	0.05	0.05
Nitrate-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No:	19-00564-11	19-00564-12	19-00564-13	19-00564-14	19-00564-15
			Sample Details:	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Near Top	Urala Creek South Near Bottom	Urala Creek South Off Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Bromide	0.1	mg/L		83	68	80	85	57
Chloride	5	mg/L		23,000	24,000	24,000	24,000	20,000
Sulfate	1	mg/L		3,000	3,100	3,100	3,100	3,000
Filterable Reactive Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L		0.05	<0.02	0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No:	19-00564-16	19-00564-17	19-00564-18	19-00564-19	19-00564-20
			Sample Details:	Urala Creek South Off Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Bromide	0.1	mg/L		50	70	57	68	52
Chloride	5	mg/L		22,000	22,000	22,000	21,000	22,000
Sulfate	1	mg/L		3,000	3,000	3,000	3,000	2,900
Filterable Reactive Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No:	19-00564-21	19-00564-22	19-00564-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
Bromide	0.1	mg/L		59	64	0.1
Chloride	5	mg/L		22,000	21,000	160
Sulfate	1	mg/L		3,000	2,700	28
Filterable Reactive Phosphorus	0.01	mg/L		<0.01	<0.01	0.07
Ammonia-N	0.02	mg/L		<0.02	<0.02	0.04

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Ions by Discrete Analyser			Sample No:	19-00564-21	19-00564-22	19-00564-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
Nitrate-N	0.01	mg/L		<0.01	<0.01	0.14
NOx-N	0.01	mg/L		<0.01	<0.01	0.22
Nitrite-N	0.01	mg/L		<0.01	<0.01	0.08

Physical Parameters			Sample No:	19-00564-1	19-00564-2	19-00564-3	19-00564-4	19-00564-5
			Sample Details:	Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
pH	0.1	pH units		8.2	8.2	8.2	8.2	8.2
Conductivity	0.01	mS/cm		55	54	52	54	55
Total Dissolved Solids	5	mg/L		38,000	42,000	37,000	39,000	42,000
Total Suspended Solids	5	mg/L		21	11	<5	<5	8
Turbidity	0.1	NTU		0.8	0.9	0.6	0.4	0.9
Chlorophyll-a	1	Total µg		<1	<1	<1	<1	<1

Physical Parameters			Sample No:	19-00564-6	19-00564-7	19-00564-8	19-00564-9	19-00564-10
			Sample Details:	Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
pH	0.1	pH units		8.2	8.2	8.2	8.2	8.2
Conductivity	0.01	mS/cm		54	56	55	55	54
Total Dissolved Solids	5	mg/L		41,000	42,000	42,000	38,000	40,000
Total Suspended Solids	5	mg/L		15	9	7	11	6
Turbidity	0.1	NTU		1.8	0.9	1.8	0.5	0.5
Chlorophyll-a	1	Total µg		<1	<1	<1	<1	<1

Physical Parameters			Sample No:	19-00564-11	19-00564-12	19-00564-13	19-00564-14	19-00564-15
			Sample Details:	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Near Top	Urala Creek South Near Bottom	Urala Creek South Off Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
pH	0.1	pH units		8.3	8.3	8.3	8.3	8.3
Conductivity	0.01	mS/cm		57	57	56	55	54
Total Dissolved Solids	5	mg/L		41,000	41,000	43,000	41,000	38,000
Total Suspended Solids	5	mg/L		<5	11	15	11	<5
Turbidity	0.1	NTU		0.9	0.7	0.8	0.6	0.8
Chlorophyll-a	1	Total µg		<1	<1	<1	<1	<1

Physical Parameters			Sample No:	19-00564-16	19-00564-17	19-00564-18	19-00564-19	19-00564-20
			Sample Details:	Urala Creek South Off Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
pH	0.1	pH units		8.3	8.3	8.3	8.2	8.3
Conductivity	0.01	mS/cm		54	54	53	52	52
Total Dissolved Solids	5	mg/L		39,000	39,000	39,000	38,000	38,000
Total Suspended Solids	5	mg/L		<5	6	9	<5	<5
Turbidity	0.1	NTU		0.9	0.5	0.5	0.3	0.4
Chlorophyll-a	1	Total µg		<1	<1	<1	<1	<1

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Physical Parameters			Sample No:	19-00564-21	19-00564-22	19-00564-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019
pH	0.1	pH units	8.2	8.3	7.4	
Conductivity	0.01	mS/cm	52	53	0.89	
Total Dissolved Solids	5	mg/L	38,000	40,000	460	
Total Suspended Solids	5	mg/L	18	10	<5	
Turbidity	0.1	NTU	0.2	0.4	0.1	

Subcontracting			Sample No:	19-00564-1	19-00564-2	19-00564-3	19-00564-4	19-00564-5
			Sample Details:	Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Organic Carbon	1	mg/L	1	<1	<1	<1	<1	<1
Dissolved Organic Carbon	1	mg/L	1	<1	<1	<1	<1	<1

Subcontracting			Sample No:	19-00564-6	19-00564-7	19-00564-8	19-00564-9	19-00564-10
			Sample Details:	Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Organic Carbon	1	mg/L	<1	<1	<1	<1	<1	<1
Dissolved Organic Carbon	1	mg/L	<1	<1	<1	<1	<1	<1

Subcontracting			Sample No:	19-00564-11	19-00564-12	19-00564-13	19-00564-14	19-00564-15
			Sample Details:	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Near Top	Urala Creek South Near Bottom	Urala Creek South Off Top
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Organic Carbon	1	mg/L	1	1	<1	1	<1	<1
Dissolved Organic Carbon	1	mg/L	1	<1	<1	1	<1	<1

Subcontracting			Sample No:	19-00564-16	19-00564-17	19-00564-18	19-00564-19	19-00564-20
			Sample Details:	Urala Creek South Off Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Organic Carbon	1	mg/L	<1	<1	<1	<1	<1	<1
Dissolved Organic Carbon	1	mg/L	<1	<1	<1	<1	<1	<1

Subcontracting			Sample No:	19-00564-21	19-00564-22	19-00564-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Organic Carbon	1	mg/L	<1	<1	<1	<1
Dissolved Organic Carbon	1	mg/L	<1	<1	<1	<1

Biochemical Oxygen Demand			Sample No:	19-00564-1	19-00564-2	19-00564-3	19-00564-4	19-00564-5
			Sample Details:	Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

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Biochemical Oxygen Demand			Sample No:	19-00564-6	19-00564-7	19-00564-8	19-00564-9	19-00564-10
			Sample Details:	Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Biochemical Oxygen Demand	5	mg/L		<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No:	19-00564-11	19-00564-12	19-00564-13	19-00564-14	19-00564-15
			Sample Details:	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Near Top	Urala Creek South Near Bottom	Urala Creek South Off Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Biochemical Oxygen Demand	5	mg/L		<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No:	19-00564-16	19-00564-17	19-00564-18	19-00564-19	19-00564-20
			Sample Details:	Urala Creek South Off Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Biochemical Oxygen Demand	5	mg/L		<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No:	19-00564-21	19-00564-22	19-00564-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
Biochemical Oxygen Demand	5	mg/L		<5	<5	<5

Result Definitions

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting
* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

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Job Number: 19-02167
Revision: 00
Date: 26 February 2019

ADDRESS: K+S Salt

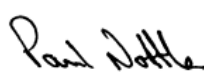



ATTENTION: Paula Cartwright

DATE RECEIVED: 12/02/2019

YOUR REFERENCE: University of WA; K+S Project

PURCHASE ORDER: K+S

APPROVALS:

			
Paul Nottle Organics Manager	Douglas Todd Laboratory Manager	Sam Becker Inorganics Manager	Sean Sangster Inorganics Supervisor

REPORT COMMENTS:

This report is issued by Analytical Reference Laboratory (WA) Pty Ltd
 Samples are analysed on an as received basis unless otherwise noted.
 Total and Dissolved Organic Carbon analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 22242

METHOD REFERENCES:

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377
 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561

Method ID	Method Description
ARL No. 007	Benzene, Toluene, Ethylbenzene and Xylenes in Water
ARL No. 005	Polycyclic Aromatic Hydrocarbons in Water
ARL No. 100	Organotins in Water
ARL No. 029	Metals in Water by AAS
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 040	Arsenic by Hydride Atomic Absorption
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids
ARL No. 016	Total Suspended Solids
ARL No. 045	Turbidity
ARL No. 141	Chlorophyll-a and Pheophytin-a in Water
Subcontracting	See Report Comments section for more information.
ARL No. 011	Biochemical Oxygen Demand



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BTEX in Water			Sample No:	19-02167-1	19-02167-2	19-02167-3	19-02167-4	19-02167-5
			Sample Details:	EVA Island Top	EVA Island Bottom	Fly Island Top	Fly Island Bottom	Locker Island Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Benzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No:	19-02167-6	19-02167-7	19-02167-8	19-02167-9	19-02167-10
			Sample Details:	Locker Island Bottom	Locker Point Top	Locker Point Bottom	Rocky Point Top	Rocky Point Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Benzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No:	19-02167-11	19-02167-12	19-02167-13	19-02167-14	19-02167-15
			Sample Details:	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek South Near Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Benzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No:	19-02167-16	19-02167-17	19-02167-18	19-02167-19	19-02167-20
			Sample Details:	Urala Creek South Near Bottom	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Benzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L		<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No:	19-02167-21	19-02167-22	19-02167-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
Benzene	0.001	mg/L		<0.001	<0.001	<0.001
Toluene	0.001	mg/L		<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L		<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L		<0.003	<0.003	<0.003

PAH in Water			Sample No:	19-02167-1	19-02167-2	19-02167-3	19-02167-4	19-02167-5
			Sample Details:	EVA Island Top	EVA Island Bottom	Fly Island Top	Fly Island Bottom	Locker Island Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Naphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No:	19-02167-1	19-02167-2	19-02167-3	19-02167-4	19-02167-5
			Sample Details:	EVA Island Top	EVA Island Bottom	Fly Island Top	Fly Island Bottom	Locker Island Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Acenaphthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No:	19-02167-6	19-02167-7	19-02167-8	19-02167-10	19-02167-12
			Sample Details:	Locker Island Bottom	Locker Point Top	Locker Point Bottom	Rocky Point Bottom	Urala Creek North Near Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Naphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No:	19-02167-13	19-02167-14	19-02167-17	19-02167-19	19-02167-20
			Sample Details:	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek South Channel Top	Urala Creek South Off Top	Urala Creek South Off Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Naphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No:	19-02167-13	19-02167-14	19-02167-17	19-02167-19	19-02167-20
			Sample Details:	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek South Channel Top	Urala Creek South Off Top	Urala Creek South Off Bottom
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No:	19-02167-21	19-02167-22	19-02167-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1

Organotins in Water			Sample No:	19-02167-1	19-02167-2	19-02167-3	19-02167-4	19-02167-5
			Sample Details:	EVA Island Top	EVA Island Bottom	Fly Island Top	Fly Island Bottom	Locker Island Top
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	8	11	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	3	<2	<2	<2	<2

Organotins in Water			Sample No:	19-02167-6	19-02167-7	19-02167-8	19-02167-9	19-02167-10
			Sample Details:	Locker Island Bottom	Locker Point Top	Locker Point Bottom	Rocky Point Top	Rocky Point Bottom
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

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Organotins in Water			Sample No:	19-02167-11	19-02167-12	19-02167-13	19-02167-14	19-02167-15
			Sample Details:	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek South Near Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Monobutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L		<2	<2	<2	<2	<2

Organotins in Water			Sample No:	19-02167-16	19-02167-17	19-02167-18	19-02167-19	19-02167-20
			Sample Details:	Urala Creek South Near Bottom	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Monobutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L		<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L		<2	<2	<2	<2	<2

Organotins in Water			Sample No:	19-02167-21	19-02167-22	19-02167-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
Monobutyl tin	5	ngSn/L		<5	<5	<5
Dibutyl tin	5	ngSn/L		10	5	<5
Tributyl tin	2	ngSn/L		<2	<2	<2

Metals in Water			Sample No:	19-02167-1	19-02167-2	19-02167-3	19-02167-4	19-02167-5
			Sample Details:	EVA Island Top	EVA Island Bottom	Fly Island Top	Fly Island Bottom	Locker Island Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Calcium - Dissolved	0.1	mg/L		720	740	750	740	730
Calcium - Total	0.1	mg/L		750	780	810	800	800
Magnesium - Dissolved	0.1	mg/L		1,200	1,200	1,300	1,300	1,300
Magnesium - Total	0.1	mg/L		1,500	1,500	1,700	1,600	1,600
Potassium - Dissolved	0.1	mg/L		650	650	650	640	650
Potassium - Total	0.1	mg/L		720	710	750	730	750
Aluminium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L		0.03	<0.01	0.02	<0.01	<0.01
Manganese - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L		0.013	0.007	<0.005	0.033	0.006
Zinc - Total	0.005	mg/L		0.013	0.007	<0.005	0.033	0.063
Arsenic - Dissolved	0.001	mg/L		0.001	0.001	0.001	0.001	0.001
Arsenic - Total	0.001	mg/L		0.002	0.001	0.002	0.001	0.002
Chromium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L		<0.001	<0.001	0.001	0.001	<0.001

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Metals in Water			Sample No:	19-02167-1	19-02167-2	19-02167-3	19-02167-4	19-02167-5
			Sample Details:	EVA Island Top	EVA Island Bottom	Fly Island Top	Fly Island Bottom	Locker Island Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Copper - Total	0.001	mg/L		0.001	0.001	0.002	0.002	0.001
Lead - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L		10,000	11,000	11,000	11,000	10,000
Sodium - Total	0.1	mg/L		11,000	11,000	11,000	11,000	11,000

Metals in Water			Sample No:	19-02167-6	19-02167-7	19-02167-8	19-02167-9	19-02167-10
			Sample Details:	Locker Island Bottom	Locker Point Top	Locker Point Bottom	Rocky Point Top	Rocky Point Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Calcium - Dissolved	0.1	mg/L		720	710	710	710	720
Calcium - Total	0.1	mg/L		800	830	770	800	820
Magnesium - Dissolved	0.1	mg/L		1,300	1,300	1,400	1,400	1,400
Magnesium - Total	0.1	mg/L		1,600	1,600	1,700	1,700	1,700
Potassium - Dissolved	0.1	mg/L		660	690	690	690	700
Potassium - Total	0.1	mg/L		730	750	770	760	780
Aluminium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L		0.01	<0.01	0.02	<0.01	<0.01
Manganese - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L		0.001	0.001	0.001	0.001	0.001
Arsenic - Total	0.001	mg/L		0.002	0.001	0.002	0.001	0.001
Chromium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	0.001	0.001
Copper - Total	0.001	mg/L		0.001	0.002	0.001	0.002	0.002
Lead - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

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Metals in Water			Sample No:	19-02167-6	19-02167-7	19-02167-8	19-02167-9	19-02167-10
			Sample Details:	Locker Island Bottom	Locker Point Top	Locker Point Bottom	Rocky Point Top	Rocky Point Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Mercury - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L		10,000	10,000	11,000	11,000	10,000
Sodium - Total	0.1	mg/L		10,000	12,000	11,000	11,000	11,000

Metals in Water			Sample No:	19-02167-11	19-02167-12	19-02167-13	19-02167-14	19-02167-15
			Sample Details:	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek South Near Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Calcium - Dissolved	0.1	mg/L		690	680	680	690	710
Calcium - Total	0.1	mg/L		760	790	760	750	830
Magnesium - Dissolved	0.1	mg/L		1,400	1,400	1,400	1,400	1,500
Magnesium - Total	0.1	mg/L		1,700	1,700	1,700	1,600	1,800
Potassium - Dissolved	0.1	mg/L		690	700	700	700	720
Potassium - Total	0.1	mg/L		770	770	780	750	800
Aluminium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L		0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L		0.001	0.001	0.001	0.001	0.001
Arsenic - Total	0.001	mg/L		0.002	0.001	0.002	0.002	0.001
Chromium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L		0.002	0.002	0.001	0.002	0.002
Lead - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L		10,000	11,000	11,000	11,000	10,000
Sodium - Total	0.1	mg/L		11,000	12,000	11,000	13,000	13,000

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Metals in Water			Sample No:	19-02167-16	19-02167-17	19-02167-18	19-02167-19	19-02167-20
			Sample Details:	Urala Creek South Near Bottom 9/01/2019	Urala Creek South Channel Top 9/01/2019	Urala Creek South Channel Bottom 9/01/2019	Urala Creek South Off Top 9/01/2019	Urala Creek South Off Bottom 9/01/2019
ANALYTE	LOR	Units						
Calcium - Dissolved	0.1	mg/L		700	890	890	670	690
Calcium - Total	0.1	mg/L		780	1,000	970	750	760
Magnesium - Dissolved	0.1	mg/L		1,500	2,000	1,900	1,400	1,500
Magnesium - Total	0.1	mg/L		1,800	2,300	2,300	1,700	1,700
Potassium - Dissolved	0.1	mg/L		720	910	910	710	710
Potassium - Total	0.1	mg/L		790	980	960	780	760
Aluminium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	0.02
Aluminium - Total	0.01	mg/L		<0.01	0.06	<0.01	<0.01	0.02
Manganese - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Tin - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L		<0.005	0.005	<0.005	<0.005	0.009
Arsenic - Dissolved	0.001	mg/L		0.001	0.001	0.001	0.001	0.002
Arsenic - Total	0.001	mg/L		0.001	0.001	0.001	0.002	0.002
Chromium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L		<0.001	0.001	0.001	0.001	<0.001
Copper - Total	0.001	mg/L		0.002	0.002	0.002	0.002	0.001
Lead - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L		10,000	12,000	13,000	10,000	11,000
Sodium - Total	0.1	mg/L		12,000	16,000	15,000	11,000	12,000

Metals in Water			Sample No:	19-02167-21	19-02167-22	19-02167-23
			Sample Details:	Tent Island Top 9/01/2019	Tent Island Bottom 9/01/2019	Locker SW 9/01/2019
ANALYTE	LOR	Units				
Calcium - Dissolved	0.1	mg/L		690	720	99
Calcium - Total	0.1	mg/L		750	780	110
Magnesium - Dissolved	0.1	mg/L		1,500	1,500	35
Magnesium - Total	0.1	mg/L		1,700	1,700	43
Potassium - Dissolved	0.1	mg/L		720	710	3.7
Potassium - Total	0.1	mg/L		740	760	4.9

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Metals in Water			Sample No:	19-02167-21	19-02167-22	19-02167-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
Aluminium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L		<0.01	<0.01	<0.01
Manganese - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L		<0.01	<0.01	<0.01
Tin - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001
Tin - Total	0.001	mg/L		<0.001	<0.001	<0.001
Vanadium - Dissolved	0.01	mg/L		<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L		<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L		<0.005	<0.005	0.037
Zinc - Total	0.005	mg/L		<0.005	<0.005	0.040
Arsenic - Dissolved	0.001	mg/L		0.001	0.001	<0.001
Arsenic - Total	0.001	mg/L		0.001	0.001	<0.001
Chromium - Dissolved	0.001	mg/L		<0.001	<0.001	0.001
Chromium - Total	0.001	mg/L		<0.001	<0.001	0.001
Cobalt - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L		<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L		<0.001	<0.001	0.16
Copper - Total	0.001	mg/L		0.001	0.001	0.19
Lead - Dissolved	0.001	mg/L		<0.001	<0.001	0.002
Lead - Total	0.001	mg/L		<0.001	<0.001	0.002
Nickel - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L		<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L		<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L		10,000	10,000	100
Sodium - Total	0.1	mg/L		12,000	13,000	120

Total Nitrogen in Water			Sample No:	19-02167-1	19-02167-2	19-02167-3	19-02167-4	19-02167-5
			Sample Details:	EVA Island Top	EVA Island Bottom	Fly Island Top	Fly Island Bottom	Locker Island Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Nitrogen	0.2	mg/L		0.4	0.3	0.5	0.5	0.6
Total Kjeldahl Nitrogen	0.2	mg/L		0.4	0.3	0.5	0.5	0.6

Total Nitrogen in Water			Sample No:	19-02167-6	19-02167-7	19-02167-8	19-02167-9	19-02167-10
			Sample Details:	Locker Island Bottom	Locker Point Top	Locker Point Bottom	Rocky Point Top	Rocky Point Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Nitrogen	0.2	mg/L		0.4	0.7	0.5	0.3	0.2
Total Kjeldahl Nitrogen	0.2	mg/L		0.4	0.7	0.5	0.3	0.2

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Total Nitrogen in Water			Sample No:	19-02167-11	19-02167-12	19-02167-13	19-02167-14	19-02167-15
			Sample Details:	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek South Near Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Nitrogen	0.2	mg/L		0.4	0.3	0.6	0.4	0.4
Total Kjeldahl Nitrogen	0.2	mg/L		0.4	0.3	0.6	0.4	0.4

Total Nitrogen in Water			Sample No:	19-02167-16	19-02167-17	19-02167-18	19-02167-19	19-02167-20
			Sample Details:	Urala Creek South Near Bottom	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Nitrogen	0.2	mg/L		0.4	0.3	0.5	0.6	0.3
Total Kjeldahl Nitrogen	0.2	mg/L		0.4	0.3	0.5	0.6	0.3

Total Nitrogen in Water			Sample No:	19-02167-21	19-02167-22	19-02167-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
Total Nitrogen	0.2	mg/L		0.5	0.4	2.0
Total Kjeldahl Nitrogen	0.2	mg/L		0.5	0.4	<0.2

Total Phosphorus in Water			Sample No:	19-02167-1	19-02167-2	19-02167-3	19-02167-4	19-02167-5
			Sample Details:	EVA Island Top	EVA Island Bottom	Fly Island Top	Fly Island Bottom	Locker Island Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No:	19-02167-6	19-02167-7	19-02167-8	19-02167-9	19-02167-10
			Sample Details:	Locker Island Bottom	Locker Point Top	Locker Point Bottom	Rocky Point Top	Rocky Point Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No:	19-02167-11	19-02167-12	19-02167-13	19-02167-14	19-02167-15
			Sample Details:	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek South Near Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Phosphorus	0.01	mg/L		<0.01	<0.01	0.02	<0.01	<0.01

Total Phosphorus in Water			Sample No:	19-02167-16	19-02167-17	19-02167-18	19-02167-19	19-02167-20
			Sample Details:	Urala Creek South Near Bottom	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Phosphorus	0.01	mg/L		<0.01	0.02	0.02	<0.01	<0.01

Total Phosphorus in Water			Sample No:	19-02167-21	19-02167-22	19-02167-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
Total Phosphorus	0.01	mg/L		<0.01	0.01	0.22

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Ions by Discrete Analyser			Sample No:	19-02167-1	19-02167-2	19-02167-3	19-02167-4	19-02167-5
			Sample Details:	EVA Island Top	EVA Island Bottom	Fly Island Top	Fly Island Bottom	Locker Island Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Bromide	0.1	mg/L		59	48	49	56	47
Chloride	5	mg/L		18,000	19,000	19,000	20,000	19,000
Sulfate	1	mg/L		2,900	3,000	3,000	3,000	2,900
Filterable Reactive Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L		0.02	0.03	0.03	0.02	0.03
NOx-N	0.01	mg/L		0.02	0.03	0.03	0.02	0.03
Nitrite-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No:	19-02167-6	19-02167-7	19-02167-8	19-02167-9	19-02167-10
			Sample Details:	Locker Island Bottom	Locker Point Top	Locker Point Bottom	Rocky Point Top	Rocky Point Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Bromide	0.1	mg/L		49	59	52	49	59
Chloride	5	mg/L		19,000	21,000	21,000	21,000	21,000
Sulfate	1	mg/L		2,900	3,000	3,000	3,000	3,000
Filterable Reactive Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L		0.03	0.03	0.02	0.03	0.03
NOx-N	0.01	mg/L		0.03	0.03	0.02	0.03	0.03
Nitrite-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No:	19-02167-11	19-02167-12	19-02167-13	19-02167-14	19-02167-15
			Sample Details:	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek South Near Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Bromide	0.1	mg/L		78	58	50	68	82
Chloride	5	mg/L		18,000	19,000	19,000	20,000	19,000
Sulfate	1	mg/L		3,100	3,000	3,000	3,000	3,100
Filterable Reactive Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L		0.03	0.04	0.03	0.05	0.02
NOx-N	0.01	mg/L		0.03	0.04	0.03	0.05	0.02
Nitrite-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No:	19-02167-16	19-02167-17	19-02167-18	19-02167-19	19-02167-20
			Sample Details:	Urala Creek South Near Bottom	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Bromide	0.1	mg/L		63	100	75	54	55
Chloride	5	mg/L		20,000	25,000	26,000	22,000	20,000
Sulfate	1	mg/L		3,100	3,800	3,700	3,000	3,100
Filterable Reactive Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L		0.02	0.03	0.03	0.03	0.03

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Ions by Discrete Analyser			Sample No:	19-02167-16	19-02167-17	19-02167-18	19-02167-19	19-02167-20
			Sample Details:	Urala Creek South Near Bottom	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
NOx-N	0.01	mg/L		0.02	0.03	0.03	0.03	0.03
Nitrite-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No:	19-02167-21	19-02167-22	19-02167-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
Bromide	0.1	mg/L		47	52	0.7
Chloride	5	mg/L		21,000	21,000	190
Sulfate	1	mg/L		3,100	3,100	28
Filterable Reactive Phosphorus	0.01	mg/L		<0.01	<0.01	0.07
Ammonia-N	0.02	mg/L		<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L		0.02	0.02	2.0
NOx-N	0.01	mg/L		0.02	0.02	2.0
Nitrite-N	0.01	mg/L		<0.01	<0.01	<0.01

Physical Parameters			Sample No:	19-02167-1	19-02167-2	19-02167-3	19-02167-4	19-02167-5
			Sample Details:	EVA Island Top	EVA Island Bottom	Fly Island Top	Fly Island Bottom	Locker Island Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
pH	0.1	pH units		7.9	8.0	8.0	8.0	8.0
Conductivity	0.01	mS/cm		53	52	54	53	52
Total Dissolved Solids	5	mg/L		34,000	37,000	37,000	38,000	36,000
Total Suspended Solids	5	mg/L		7	12	<5	8	9
Turbidity	0.1	NTU		0.9	0.9	1.9	1.9	0.6
Chlorophyll-a	1	Total µg		<1	<1	<1	<1	<1

Physical Parameters			Sample No:	19-02167-6	19-02167-7	19-02167-8	19-02167-9	19-02167-10
			Sample Details:	Locker Island Bottom	Locker Point Top	Locker Point Bottom	Rocky Point Top	Rocky Point Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
pH	0.1	pH units		8.0	8.0	8.0	8.0	8.0
Conductivity	0.01	mS/cm		53	55	54	54	55
Total Dissolved Solids	5	mg/L		36,000	38,000	39,000	39,000	38,000
Total Suspended Solids	5	mg/L		<5	<5	7	11	7
Turbidity	0.1	NTU		2.4	1.5	1.7	1.2	1.5
Chlorophyll-a	1	Total µg		<1	<1	<1	<1	<1

Physical Parameters			Sample No:	19-02167-11	19-02167-12	19-02167-13	19-02167-14	19-02167-15
			Sample Details:	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek South Near Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
pH	0.1	pH units		8.0	8.0	8.1	8.1	8.1
Conductivity	0.01	mS/cm		55	54	54	55	55
Total Dissolved Solids	5	mg/L		35,000	37,000	37,000	38,000	36,000
Total Suspended Solids	5	mg/L		<5	6	<5	<5	<5
Turbidity	0.1	NTU		1.4	1.1	1.4	1.2	1.1
Chlorophyll-a	1	Total µg		<1	<1	<1	<1	<1

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Physical Parameters			Sample No:	19-02167-16	19-02167-17	19-02167-18	19-02167-19	19-02167-20
			Sample Details:	Urala Creek South Near Bottom	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
pH	0.1	pH units		8.1	7.9	7.9	8.0	8.0
Conductivity	0.01	mS/cm		56	67	67	55	55
Total Dissolved Solids	5	mg/L		37,000	46,000	47,000	39,000	38,000
Total Suspended Solids	5	mg/L		6	8	6	5	<5
Turbidity	0.1	NTU		1.2	3.4	3.4	2.2	2.3
Chlorophyll-a	1	Total µg		<1	<1	<1	<1	<1

Physical Parameters			Sample No:	19-02167-21	19-02167-22	19-02167-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019
pH	0.1	pH units		8.0	8.0	7.6
Conductivity	0.01	mS/cm		54	55	1.2
Total Dissolved Solids	5	mg/L		38,000	38,000	500
Total Suspended Solids	5	mg/L		<5	<5	<5
Turbidity	0.1	NTU		0.8	1.1	0.1
Chlorophyll-a	1	Total µg		<1	<1	<1

Subcontracting			Sample No:	19-02167-1	19-02167-2	19-02167-3	19-02167-4	19-02167-5
			Sample Details:	EVA Island Top	EVA Island Bottom	Fly Island Top	Fly Island Bottom	Locker Island Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Organic Carbon	1	mg/L		1	1	1	1	1
Dissolved Organic Carbon	1	mg/L		<1	<1	1	<1	<1

Subcontracting			Sample No:	19-02167-6	19-02167-7	19-02167-8	19-02167-9	19-02167-10
			Sample Details:	Locker Island Bottom	Locker Point Top	Locker Point Bottom	Rocky Point Top	Rocky Point Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Organic Carbon	1	mg/L		<1	1	1	1	1
Dissolved Organic Carbon	1	mg/L		<1	1	1	1	1

Subcontracting			Sample No:	19-02167-11	19-02167-12	19-02167-13	19-02167-14	19-02167-15
			Sample Details:	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek South Near Top
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Organic Carbon	1	mg/L		1	2	1	1	1
Dissolved Organic Carbon	1	mg/L		1	1	1	1	1

Subcontracting			Sample No:	19-02167-16	19-02167-17	19-02167-18	19-02167-19	19-02167-20
			Sample Details:	Urala Creek South Near Bottom	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom
ANALYTE	LOR	Units		9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Organic Carbon	1	mg/L		1	2	2	1	1
Dissolved Organic Carbon	1	mg/L		1	2	2	1	1

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Subcontracting			Sample No:	19-02167-21	19-02167-22	19-02167-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Total Organic Carbon	1	mg/L	1	1	<1	<1
Dissolved Organic Carbon	1	mg/L	1	1	<1	<1

Biochemical Oxygen Demand			Sample No:	19-02167-1	19-02167-2	19-02167-3	19-02167-4	19-02167-5
			Sample Details:	EVA Island Top	EVA Island Bottom	Fly Island Top	Fly Island Bottom	Locker Island Top
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No:	19-02167-6	19-02167-7	19-02167-8	19-02167-9	19-02167-10
			Sample Details:	Locker Island Bottom	Locker Point Top	Locker Point Bottom	Rocky Point Top	Rocky Point Bottom
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No:	19-02167-11	19-02167-12	19-02167-13	19-02167-14	19-02167-15
			Sample Details:	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek South Near Top
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No:	19-02167-16	19-02167-17	19-02167-18	19-02167-19	19-02167-20
			Sample Details:	Urala Creek South Near Bottom	Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No:	19-02167-21	19-02167-22	19-02167-23
			Sample Details:	Tent Island Top	Tent Island Bottom	Locker SW
ANALYTE	LOR	Units	9/01/2019	9/01/2019	9/01/2019	9/01/2019
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5

Result Definitions

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting
* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

LABORATORY REPORT

Job Number: 19-04026
Revision: 00
Date: 5 April 2019

ADDRESS: K+S Salt

ATTENTION: Paula Cartwright

DATE RECEIVED: 15/03/2019

YOUR REFERENCE: University of WA; K+S Project

PURCHASE ORDER: K+S

APPROVALS:


 Paul Nottle Douglas Todd Sean Sangster
 Organics Manager Laboratory Manager Inorganics Supervisor

REPORT COMMENTS:

This report is issued by Analytical Reference Laboratory (WA) Pty Ltd. The report shall not be reproduced except in full without written approval from the laboratory.
 Samples are analysed on an as received basis unless otherwise noted.
 Total and Dissolved Organic Carbon analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 223847

METHOD REFERENCES:

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377
 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561

Method ID	Method Description
ARL No. 007	Benzene, Toluene, Ethylbenzene and Xylenes in Water
ARL No. 005	Polycyclic Aromatic Hydrocarbons in Water
ARL No. 100	Organotins in Water
ARL No. 029	Metals in Water by AAS
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 040	Arsenic by Hydride Atomic Absorption
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids
ARL No. 016	Total Suspended Solids
ARL No. 045	Turbidity
ARL No. 141	Chlorophyll-a and Pheophytin-a in Water
Subcontracting	See Report Comments section for more information.
ARL No. 011	Biochemical Oxygen Demand



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BTEX in Water			Sample No	19-04026-1	19-04026-2	19-04026-3	19-04026-4	19-04026-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Island Bottom	Locker Point Bottom
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-04026-6	19-04026-7	19-04026-8	19-04026-9	19-04026-10
Sample Description			Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek North Near Bottom
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-04026-11	19-04026-12	19-04026-13	19-04026-14	19-04026-15
Sample Description			Urala Creek South Channel Top	Urala Creek South Near Top	Urala Creek South Off Top	Urala Creek South Off Bottom	Urala Creek South Off Bottom	Fly Island Top
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-04026-16	19-04026-17	19-04026-18	19-04026-19	19-04026-20
Sample Description			Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top	Tent Island Bottom	Tent Island Bottom
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-04026-21
Sample Description			Locker SW	
Sample Date			15/03/2019	
ANALYTE	LOR	Units	Result	
Benzene	0.001	mg/L	<0.001	
Toluene	0.001	mg/L	<0.001	
Ethylbenzene	0.001	mg/L	<0.001	
Xylenes (Total)	0.003	mg/L	<0.003	

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PAH in Water			Sample No	19-04026-1	19-04026-2	19-04026-3	19-04026-4	19-04026-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom	
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-04026-6	19-04026-7	19-04026-8	19-04026-9	19-04026-10
Sample Description			Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom	
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	19-04026-11	19-04026-12	19-04026-13	19-04026-14	19-04026-15
Sample Description			Urala Creek South Channel Top	Urala Creek South Near Top	Urala Creek South Off Top	Urala Creek South Off Bottom	Fly Island Top	
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-04026-16	19-04026-17	19-04026-18	19-04026-19	19-04026-20
Sample Description			Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top	Tent Island Bottom	
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-04026-21
Sample Description			Locker SW	
Sample Date			15/03/2019	
ANALYTE	LOR	Units	Result	
Naphthalene	0.1	µg/L	<0.1	
2-Methylnaphthalene	0.1	µg/L	<0.1	

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PAH in Water		Sample No	19-04026-21
Sample Description		Locker SW	
Sample Date		15/03/2019	
Acenaphthylene	0.1	µg/L	<0.1
Acenaphthene	0.1	µg/L	<0.1
Fluorene	0.1	µg/L	<0.1
Phenanthrene	0.1	µg/L	<0.1
Anthracene	0.1	µg/L	<0.1
Fluoranthene	0.1	µg/L	<0.1
Pyrene	0.1	µg/L	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1
Chrysene	0.1	µg/L	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1

Organotins in Water			Sample No	19-04026-1	19-04026-2	19-04026-3	19-04026-4	19-04026-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom	
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	

Organotins in Water			Sample No	19-04026-6	19-04026-7	19-04026-8	19-04026-9	19-04026-10
Sample Description			Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom	
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	

Organotins in Water			Sample No	19-04026-11	19-04026-12	19-04026-13	19-04026-14	19-04026-15
Sample Description			Urala Creek South Channel Top	Urala Creek South Near Top	Urala Creek South Off Top	Urala Creek South Off Bottom	Fly Island Top	
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	

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Organotins in Water			Sample No	19-04026-16	19-04026-17	19-04026-18	19-04026-19	19-04026-20
Sample Description				Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top	Tent Island Bottom
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

Organotins in Water			Sample No	19-04026-21
Sample Description				Locker SW
Sample Date				15/03/2019
ANALYTE	LOR	Units	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5
Tributyl tin	2	ngSn/L	<2	<2

Metals in Water			Sample No	19-04026-1	19-04026-2	19-04026-3	19-04026-4	19-04026-5
Sample Description				Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Calcium - Dissolved	0.1	mg/L	410	430	430	430	430	430
Calcium - Total	0.1	mg/L	440	440	430	430	430	430
Magnesium - Dissolved	0.1	mg/L	1,300	1,300	1,300	1,300	1,300	1,400
Magnesium - Total	0.1	mg/L	1,400	1,500	1,400	1,400	1,400	1,400
Potassium - Dissolved	0.1	mg/L	390	390	380	390	390	390
Potassium - Total	0.1	mg/L	390	390	380	390	390	390
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	0.08	0.03	0.02	0.01	0.01	0.02
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tin - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L	0.001	0.001	0.001	0.001	0.001	0.001
Arsenic - Total	0.001	mg/L	0.001	0.001	0.001	0.001	0.001	0.001
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

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Metals in Water			Sample No	19-04026-1	19-04026-2	19-04026-3	19-04026-4	19-04026-5
Sample Description				Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
Mercury - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L		11,000	11,000	12,000	11,000	12,000
Sodium - Total	0.1	mg/L		13,000	13,000	12,000	13,000	12,000

Metals in Water			Sample No	19-04026-6	19-04026-7	19-04026-8	19-04026-9	19-04026-10
Sample Description				Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Calcium - Dissolved	0.1	mg/L	430	430	440	420	430	
Calcium - Total	0.1	mg/L	430	430	440	430	430	
Magnesium - Dissolved	0.1	mg/L	1,400	1,400	1,300	1,400	1,300	
Magnesium - Total	0.1	mg/L	1,400	1,400	1,400	1,400	1,400	
Potassium - Dissolved	0.1	mg/L	400	390	400	370	380	
Potassium - Total	0.1	mg/L	400	390	400	370	380	
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Aluminium - Total	0.01	mg/L	<0.01	0.01	<0.01	0.02	<0.01	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Dissolved	0.001	mg/L	0.003	0.001	<0.001	<0.001	<0.001	
Tin - Total	0.001	mg/L	0.003	0.002	<0.001	<0.001	<0.001	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Zinc - Total	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.001	0.001	0.001	0.001	0.001	
Arsenic - Total	0.001	mg/L	0.001	0.001	0.001	0.001	0.001	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Total	0.001	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Sodium - Dissolved	0.1	mg/L	12,000	12,000	11,000	12,000	12,000	

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Metals in Water			Sample No	19-04026-6	19-04026-7	19-04026-8	19-04026-9	19-04026-10
Sample Description			Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek North Near Bottom
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
Sodium - Total	0.1	mg/L	13,000	12,000	13,000	13,000	13,000	12,000

Metals in Water			Sample No	19-04026-11	19-04026-12	19-04026-13	19-04026-14	19-04026-15
Sample Description			Urala Creek South Channel Top	Urala Creek South Near Top	Urala Creek South Off Top	Urala Creek South Off Bottom	Urala Creek South Off Bottom	Fly Island Top
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Calcium - Dissolved	0.1	mg/L	530	430	440	450	430	
Calcium - Total	0.1	mg/L	530	470	450	460	430	
Magnesium - Dissolved	0.1	mg/L	1,700	1,400	1,400	1,400	1,300	
Magnesium - Total	0.1	mg/L	1,700	1,500	1,500	1,400	1,400	
Potassium - Dissolved	0.1	mg/L	480	390	400	400	360	
Potassium - Total	0.1	mg/L	480	390	400	400	370	
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Aluminium - Total	0.01	mg/L	0.02	<0.01	0.02	0.01	<0.01	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Dissolved	0.001	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	
Tin - Total	0.001	mg/L	0.003	<0.001	<0.001	0.002	<0.001	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	0.011	<0.005	<0.005	<0.005	<0.005	
Zinc - Total	0.005	mg/L	0.013	<0.005	0.005	<0.005	<0.005	
Arsenic - Dissolved	0.001	mg/L	<0.001	0.001	0.001	0.001	0.001	
Arsenic - Total	0.001	mg/L	0.001	0.001	0.001	0.002	0.002	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	0.002	<0.001	<0.001	<0.001	<0.001	
Copper - Total	0.001	mg/L	0.002	<0.001	0.001	<0.001	<0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Sodium - Dissolved	0.1	mg/L	15,000	12,000	12,000	12,000	11,000	
Sodium - Total	0.1	mg/L	16,000	14,000	14,000	14,000	13,000	

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Metals in Water			Sample No	19-04026-16	19-04026-17	19-04026-18	19-04026-19	19-04026-20
Sample Description				Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top	Tent Island Bottom
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Calcium - Dissolved	0.1	mg/L	410	410	420	520	440	
Calcium - Total	0.1	mg/L	430	410	420	520	440	
Magnesium - Dissolved	0.1	mg/L	1,300	1,300	1,400	1,600	1,300	
Magnesium - Total	0.1	mg/L	1,400	1,300	1,400	1,700	1,400	
Potassium - Dissolved	0.1	mg/L	350	350	340	460	370	
Potassium - Total	0.1	mg/L	370	350	350	470	390	
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	0.01	0.01	
Aluminium - Total	0.01	mg/L	0.02	<0.01	<0.01	0.05	<0.01	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Dissolved	0.001	mg/L	0.001	0.001	0.003	0.002	0.001	
Tin - Total	0.001	mg/L	0.002	0.001	0.003	0.002	0.001	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	0.009	<0.005	
Zinc - Total	0.005	mg/L	<0.005	<0.005	<0.005	0.014	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.001	0.001	0.001	0.001	0.001	
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.001	0.001	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	0.001	<0.001	
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	0.003	<0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Sodium - Dissolved	0.1	mg/L	11,000	11,000	11,000	15,000	13,000	
Sodium - Total	0.1	mg/L	13,000	12,000	12,000	15,000	13,000	

Metals in Water			Sample No	19-04026-21
Sample Description				Locker SW
Sample Date				15/03/2019
ANALYTE	LOR	Units	Result	Result
Calcium - Dissolved	0.1	mg/L	66	
Calcium - Total	0.1	mg/L	82	
Magnesium - Dissolved	0.1	mg/L	28	
Magnesium - Total	0.1	mg/L	36	
Potassium - Dissolved	0.1	mg/L	6.0	
Potassium - Total	0.1	mg/L	6.0	

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Metals in Water		Sample No	19-04026-21
		Sample Description	Locker SW
		Sample Date	15/03/2019
Aluminium - Dissolved	0.01	mg/L	<0.01
Aluminium - Total	0.01	mg/L	<0.01
Manganese - Dissolved	0.01	mg/L	<0.01
Manganese - Total	0.01	mg/L	<0.01
Tin - Dissolved	0.001	mg/L	0.002
Tin - Total	0.001	mg/L	0.003
Vanadium - Dissolved	0.01	mg/L	<0.01
Vanadium - Total	0.01	mg/L	<0.01
Zinc - Dissolved	0.005	mg/L	0.029
Zinc - Total	0.005	mg/L	0.047
Arsenic - Dissolved	0.001	mg/L	<0.001
Arsenic - Total	0.001	mg/L	<0.001
Chromium - Dissolved	0.001	mg/L	<0.001
Chromium - Total	0.001	mg/L	0.001
Cobalt - Dissolved	0.001	mg/L	<0.001
Cobalt - Total	0.001	mg/L	<0.001
Copper - Dissolved	0.001	mg/L	0.095
Copper - Total	0.001	mg/L	0.12
Lead - Dissolved	0.001	mg/L	0.001
Lead - Total	0.001	mg/L	0.002
Nickel - Dissolved	0.001	mg/L	<0.001
Nickel - Total	0.001	mg/L	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001
Selenium - Total	0.001	mg/L	<0.001
Sodium - Dissolved	0.1	mg/L	95
Sodium - Total	0.1	mg/L	110

Total Nitrogen in Water		Sample No	19-04026-1	19-04026-2	19-04026-3	19-04026-4	19-04026-5
		Sample Description	Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
		Sample Date	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.2	0.2	0.3	0.2	0.2
Total Kjeldahl Nitrogen	0.2	mg/L	0.2	0.2	0.3	0.2	0.2

Total Nitrogen in Water		Sample No	19-04026-6	19-04026-7	19-04026-8	19-04026-9	19-04026-10
		Sample Description	Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
		Sample Date	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	0.2	0.2	0.3	0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	0.2	0.2	0.3	0.2

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Total Nitrogen in Water			Sample No	19-04026-11	19-04026-12	19-04026-13	19-04026-14	19-04026-15
Sample Description				Urala Creek South Channel Top	Urala Creek South Near Top	Urala Creek South Off Top	Urala Creek South Off Bottom	Fly Island Top
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.3	0.3	0.3	<0.2	0.4	0.4
Total Kjeldahl Nitrogen	0.2	mg/L	0.3	0.3	0.3	<0.2	0.4	0.4

Total Nitrogen in Water			Sample No	19-04026-16	19-04026-17	19-04026-18	19-04026-19	19-04026-20
Sample Description				Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top	Tent Island Bottom
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.3	0.3	<0.2	0.2	0.2	0.2
Total Kjeldahl Nitrogen	0.2	mg/L	0.3	0.3	<0.2	0.2	0.2	0.2

Total Nitrogen in Water			Sample No	19-04026-21
Sample Description				Locker SW
Sample Date				15/03/2019
ANALYTE	LOR	Units	Result	Result
Total Nitrogen	0.2	mg/L	1.9	1.9
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2

Total Phosphorus in Water			Sample No	19-04026-1	19-04026-2	19-04026-3	19-04026-4	19-04026-5
Sample Description				Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	<0.01	0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No	19-04026-6	19-04026-7	19-04026-8	19-04026-9	19-04026-10
Sample Description				Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No	19-04026-11	19-04026-12	19-04026-13	19-04026-14	19-04026-15
Sample Description				Urala Creek South Channel Top	Urala Creek South Near Top	Urala Creek South Off Top	Urala Creek South Off Bottom	Fly Island Top
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No	19-04026-16	19-04026-17	19-04026-18	19-04026-19	19-04026-20
Sample Description				Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top	Tent Island Bottom
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

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Total Phosphorus in Water		Sample No	19-04026-21
Sample Description		Locker SW	
Sample Date		15/03/2019	
ANALYTE	LOR	Units	Result
Total Phosphorus	0.01	mg/L	0.23

Ions by Discrete Analyser		Sample No	19-04026-1	19-04026-2	19-04026-3	19-04026-4	19-04026-5
Sample Description		Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Bottom
Sample Date		15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	87	87	89	86	83
Chloride	5	mg/L	22,000	22,000	24,000	22,000	24,000
Sulfate	1	mg/L	3,000	3,100	3,000	3,000	3,000
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	<0.01	<0.01	0.02	0.04	0.04
NOx-N	0.01	mg/L	<0.01	<0.01	0.02	0.04	0.04
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser		Sample No	19-04026-6	19-04026-7	19-04026-8	19-04026-9	19-04026-10
Sample Description		Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek North Near Bottom
Sample Date		15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	90	89	86	93	85
Chloride	5	mg/L	24,000	24,000	23,000	24,000	21,000
Sulfate	1	mg/L	3,100	3,100	2,900	3,000	3,100
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	<0.01	<0.01	0.01	<0.01	<0.01
NOx-N	0.01	mg/L	<0.01	<0.01	0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser		Sample No	19-04026-11	19-04026-12	19-04026-13	19-04026-14	19-04026-15
Sample Description		Urala Creek South Channel Top	Urala Creek South Near Top	Urala Creek South Off Top	Urala Creek South Off Bottom	Fly Island Top	Fly Island Top
Sample Date		15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	77	86	95	90	77
Chloride	5	mg/L	27,000	22,000	24,000	24,000	22,000
Sulfate	1	mg/L	3,700	3,200	3,200	3,300	3,000
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	0.04	<0.02	<0.02
Nitrate-N	0.01	mg/L	0.03	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L	0.03	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01

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Ions by Discrete Analyser			Sample No	19-04026-16	19-04026-17	19-04026-18	19-04026-19	19-04026-20
Sample Description				Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top	Tent Island Bottom
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	71	90	83	120	96	
Chloride	5	mg/L	22,000	22,000	22,000	26,000	22,000	
Sulfate	1	mg/L	3,100	2,900	3,000	3,700	3,100	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	0.01	<0.01	<0.01	<0.01	
NOx-N	0.01	mg/L	<0.01	0.01	<0.01	<0.01	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	

Ions by Discrete Analyser			Sample No	19-04026-21
Sample Description				Locker SW
Sample Date				15/03/2019
ANALYTE	LOR	Units	Result	Result
Bromide	0.1	mg/L	1.7	
Chloride	5	mg/L	250	
Sulfate	1	mg/L	30	
Filterable Reactive Phosphorus	0.01	mg/L	0.06	
Ammonia-N	0.02	mg/L	<0.02	
Nitrate-N	0.01	mg/L	1.9	
NOx-N	0.01	mg/L	1.9	
Nitrite-N	0.01	mg/L	<0.01	

Physical Parameters			Sample No	19-04026-1	19-04026-2	19-04026-3	19-04026-4	19-04026-5
Sample Description				Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	7.8	8.1	8.1	8.1	8.1	8.1
Conductivity	0.01	mS/cm	40	47	45	46	44	
Total Dissolved Solids	5	mg/L	39,000	40,000	41,000	40,000	42,000	
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5	
Turbidity	0.1	NTU	7.5	1.2	1.7	0.6	2.9	
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	

Physical Parameters			Sample No	19-04026-6	19-04026-7	19-04026-8	19-04026-9	19-04026-10
Sample Description				Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.1	8.1	8.1	8.1	8.1	8.1
Conductivity	0.01	mS/cm	48	48	45	46	47	
Total Dissolved Solids	5	mg/L	41,000	41,000	42,000	43,000	38,000	
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5	
Turbidity	0.1	NTU	0.8	1.8	2.7	0.6	1.9	
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	

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Physical Parameters			Sample No	19-04026-11	19-04026-12	19-04026-13	19-04026-14	19-04026-15
Sample Description				Urala Creek South Channel Top	Urala Creek South Near Top	Urala Creek South Off Top	Urala Creek South Off Bottom	Fly Island Top
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.1	8.1	8.2	8.1	8.1	8.1
Conductivity	0.01	mS/cm	59	46	48	51	49	49
Total Dissolved Solids	5	mg/L	51,000	42,000	44,000	44,000	39,000	39,000
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5	<5
Turbidity	0.1	NTU	2.5	1.0	2.3	2.6	1.5	1.5
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	<1

Physical Parameters			Sample No	19-04026-16	19-04026-17	19-04026-18	19-04026-19	19-04026-20
Sample Description				Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top	Tent Island Bottom
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.2	8.2	8.2	8.1	8.2	8.2
Conductivity	0.01	mS/cm	48	47	48	59	50	50
Total Dissolved Solids	5	mg/L	42,000	41,000	39,000	49,000	43,000	43,000
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5	<5
Turbidity	0.1	NTU	3.9	1.4	1.5	2.4	1.1	1.1
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	<1

Physical Parameters			Sample No	19-04026-21
Sample Description				Locker SW
Sample Date				15/03/2019
ANALYTE	LOR	Units	Result	Result
pH	0.1	pH units	7.8	7.8
Conductivity	0.01	mS/cm	1.4	1.4
Total Dissolved Solids	5	mg/L	860	860
Total Suspended Solids	5	mg/L	<5	<5
Turbidity	0.1	NTU	6.2	6.2
Chlorophyll-a	1	Total µg	<1	<1

Subcontracting			Sample No	19-04026-1	19-04026-2	19-04026-3	19-04026-4	19-04026-5
Sample Description				Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	1	<1	1	1	1
Dissolved Organic Carbon	1	mg/L	1	<1	<1	<1	<1	<1

Subcontracting			Sample No	19-04026-6	19-04026-7	19-04026-8	19-04026-9	19-04026-10
Sample Description				Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
Sample Date				15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	1	<1	<1	1	1
Dissolved Organic Carbon	1	mg/L	<1	<1	<1	<1	<1	<1

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Subcontracting			Sample No	19-04026-11	19-04026-12	19-04026-13	19-04026-14	19-04026-15
Sample Description			Urala Creek South Channel Top	Urala Creek South Near Top	Urala Creek South Off Top	Urala Creek South Off Bottom	Fly Island Top	
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	2	1	2	2	1	
Dissolved Organic Carbon	1	mg/L	2	1	1	1	<1	

Subcontracting			Sample No	19-04026-16	19-04026-17	19-04026-18	19-04026-19	19-04026-20
Sample Description			Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top	Tent Island Bottom	
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	<1	<1	2	1	
Dissolved Organic Carbon	1	mg/L	<1	<1	<1	2	1	

Subcontracting			Sample No	19-04026-21
Sample Description			Locker SW	
Sample Date			15/03/2019	
ANALYTE	LOR	Units	Result	
Total Organic Carbon	1	mg/L	<1	
Dissolved Organic Carbon	1	mg/L	<1	

Biochemical Oxygen Demand			Sample No	19-04026-1	19-04026-2	19-04026-3	19-04026-4	19-04026-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom	
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	

Biochemical Oxygen Demand			Sample No	19-04026-6	19-04026-7	19-04026-8	19-04026-9	19-04026-10
Sample Description			Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom	
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	

Biochemical Oxygen Demand			Sample No	19-04026-11	19-04026-12	19-04026-13	19-04026-14	19-04026-15
Sample Description			Urala Creek South Channel Top	Urala Creek South Near Top	Urala Creek South Off Top	Urala Creek South Off Bottom	Fly Island Top	
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	

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Biochemical Oxygen Demand		Sample No	19-04026-16	19-04026-17	19-04026-18	19-04026-19	19-04026-20
Sample Description			Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top	Tent Island Bottom
Sample Date			15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5

Biochemical Oxygen Demand		Sample No	19-04026-21
Sample Description			Locker SW
Sample Date			15/03/2019
ANALYTE	LOR	Units	Result
Biochemical Oxygen Demand	5	mg/L	<5

Result Definitions

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting
* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

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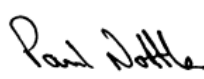



ATTENTION: Paula Cartwright

DATE RECEIVED: 4/04/2019

YOUR REFERENCE: University of WA; K+S Project

PURCHASE ORDER: K+S

APPROVALS:

 Paul Nottle Organics Manager	 Douglas Todd Laboratory Manager	 Sean Sangster Inorganics Supervisor	 Sam Becker Inorganics Manager
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REPORT COMMENTS:

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Samples are analysed on an as received basis unless otherwise noted.

Total and Dissolved Organic Carbon analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 224950

METHOD REFERENCES:

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377
 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561
 Methods prefixed with "EDP" are covered under NATA Accreditation Number: 19290

Method ID	Method Description
ARL No. 007	Benzene, Toluene, Ethylbenzene and Xylenes in Water
ARL No. 005	Polycyclic Aromatic Hydrocarbons in Water
ARL No. 100	Organotins in Water
ARL No. 029	Metals in Water by AAS
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 040	Arsenic by Hydride Atomic Absorption
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids
ARL No. 016	Total Suspended Solids
ARL No. 045	Turbidity
ARL No. 141	Chlorophyll-a and Pheophytin-a in Water
ARL No. 011	Biochemical Oxygen Demand
Subcontracting	See Report Comments section for more information.



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BTEX in Water			Sample No	19-05196-1	19-05196-2	19-05196-3	19-05196-4	19-05196-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom	
Sample Date			2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-05196-6	19-05196-7	19-05196-8	19-05196-9	19-05196-10
Sample Description			Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom	
Sample Date			2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-05196-11	19-05196-12	19-05196-13	19-05196-14	19-05196-15
Sample Description			Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom	Urala Creek South Near Top	
Sample Date			3/04/2019	3/04/2019	3/04/2019	3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-05196-16	19-05196-17	19-05196-18	19-05196-19	19-05196-20
Sample Description			Urala Creek South Near Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			3/04/2019	2/04/2019	2/04/2019	3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-05196-21	19-05196-22	19-05196-23
Sample Description			Tent Island Top	Tent Island Bottom	Locker SW	
Sample Date			3/04/2019	3/04/2019	3/04/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003

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PAH in Water			Sample No	19-05196-1	19-05196-2	19-05196-3	19-05196-4	19-05196-5
Sample Description				Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
Sample Date				2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-05196-6	19-05196-7	19-05196-8	19-05196-9	19-05196-10
Sample Description				Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
Sample Date				2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	19-05196-11	19-05196-12	19-05196-13	19-05196-14	19-05196-15
Sample Description			Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom	Urala Creek South Near Top	Urala Creek South Near Top
Sample Date			3/04/2019	3/04/2019	3/04/2019	3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-05196-16	19-05196-17	19-05196-18	19-05196-19	19-05196-20
Sample Description			Urala Creek South Near Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Eva Island Bottom
Sample Date			3/04/2019	2/04/2019	2/04/2019	3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	19-05196-21	19-05196-22	19-05196-23
Sample Description			Tent Island Top	Tent Island Bottom	Locker SW	
Sample Date			3/04/2019	3/04/2019	3/04/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	

Organotins in Water			Sample No	19-05196-1	19-05196-2	19-05196-3	19-05196-4	19-05196-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom	
Sample Date			2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Monobutyl tin	5	ngSn/L	14	31	55	21	<5	
Dibutyl tin	5	ngSn/L	<5	6	10	6	<5	
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	

Organotins in Water			Sample No	19-05196-6	19-05196-7	19-05196-8	19-05196-9	19-05196-10
Sample Description			Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom	
Sample Date			2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	

Organotins in Water			Sample No	19-05196-11	19-05196-12	19-05196-13	19-05196-14	19-05196-15
Sample Description			Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom	Urala Creek South Near Top	
Sample Date			3/04/2019	3/04/2019	3/04/2019	3/04/2019	3/04/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	

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Organotins in Water			Sample No	19-05196-16	19-05196-17	19-05196-18	19-05196-19	19-05196-20
Sample Description			Urala Creek South Near Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			3/04/2019	2/04/2019	2/04/2019	3/04/2019	3/04/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	110	350	<5	<5	
Dibutyl tin	5	ngSn/L	<5	12	36	6	<5	
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	

Organotins in Water			Sample No	19-05196-21	19-05196-22	19-05196-23
Sample Description			Tent Island Top	Tent Island Bottom	Locker SW	
Sample Date			3/04/2019	3/04/2019	3/04/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	23	<5	
Dibutyl tin	5	ngSn/L	6	8	<5	
Tributyl tin	2	ngSn/L	<2	<2	<2	

Metals in Water			Sample No	19-05196-1	19-05196-2	19-05196-3	19-05196-4	19-05196-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom	
Sample Date			2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Calcium - Dissolved	0.1	mg/L	670	680	680	670	670	
Calcium - Total	0.1	mg/L	670	680	680	670	670	
Magnesium - Dissolved	0.1	mg/L	2,000	2,100	2,000	2,000	2,000	
Magnesium - Total	0.1	mg/L	2,100	2,200	2,100	2,100	2,100	
Potassium - Dissolved	0.1	mg/L	520	530	520	520	520	
Potassium - Total	0.1	mg/L	520	530	520	520	520	
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Aluminium - Total	0.01	mg/L	<0.01	<0.01	0.02	<0.01	<0.01	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	0.007	<0.005	<0.005	<0.005	<0.005	
Zinc - Total	0.005	mg/L	0.007	<0.005	<0.005	0.006	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Total	0.001	mg/L	0.001	0.002	0.001	0.002	0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	

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Metals in Water			Sample No	19-05196-1	19-05196-2	19-05196-3	19-05196-4	19-05196-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom	
Sample Date			2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L	11,000	11,000	12,000	12,000	12,000	12,000
Sodium - Total	0.1	mg/L	11,000	11,000	12,000	12,000	12,000	13,000

Metals in Water			Sample No	19-05196-6	19-05196-7	19-05196-8	19-05196-9	19-05196-10
Sample Description			Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom	
Sample Date			2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Calcium - Dissolved	0.1	mg/L	700	670	700	680	690	
Calcium - Total	0.1	mg/L	700	690	700	680	690	
Magnesium - Dissolved	0.1	mg/L	2,100	1,900	2,100	200	2,100	
Magnesium - Total	0.1	mg/L	2,200	2,100	2,200	2,100	2,200	
Potassium - Dissolved	0.1	mg/L	540	510	540	530	530	
Potassium - Total	0.1	mg/L	540	540	560	540	550	
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Aluminium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.04	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Zinc - Total	0.005	mg/L	0.009	<0.005	<0.005	<0.005	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	0.001	<0.001	0.003	0.001	0.002	
Copper - Total	0.001	mg/L	0.003	0.002	0.003	0.002	0.005	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	

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Metals in Water			Sample No	19-05196-6	19-05196-7	19-05196-8	19-05196-9	19-05196-10
Sample Description			Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
Sample Date			2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019
Sodium - Dissolved	0.1	mg/L	11,000	11,000	11,000	11,000	11,000	12,000
Sodium - Total	0.1	mg/L	11,000	11,000	12,000	11,000	11,000	12,000

Metals in Water			Sample No	19-05196-11	19-05196-12	19-05196-13	19-05196-14	19-05196-15
Sample Description			Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom	Urala Creek South Near Top	Urala Creek South Near Top
Sample Date			3/04/2019	3/04/2019	3/04/2019	3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Calcium - Dissolved	0.1	mg/L	730	740	670	670	680	
Calcium - Total	0.1	mg/L	730	740	670	670	710	
Magnesium - Dissolved	0.1	mg/L	1,700	1,700	2,000	2,000	2,000	
Magnesium - Total	0.1	mg/L	1,600	1,600	2,100	2,100	2,200	
Potassium - Dissolved	0.1	mg/L	570	560	520	520	540	
Potassium - Total	0.1	mg/L	570	570	520	520	540	
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	0.03	<0.01	<0.01	
Aluminium - Total	0.01	mg/L	<0.01	<0.01	0.03	<0.01	<0.01	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Zinc - Total	0.005	mg/L	<0.005	<0.005	0.018	<0.005	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	0.001	<0.001	0.001	<0.001	0.001	
Copper - Total	0.001	mg/L	0.002	0.001	0.002	0.002	0.002	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Sodium - Dissolved	0.1	mg/L	12,000	12,000	11,000	11,000	11,000	
Sodium - Total	0.1	mg/L	12,000	12,000	11,000	10,000	11,000	

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Metals in Water			Sample No	19-05196-16	19-05196-17	19-05196-18	19-05196-19	19-05196-20
Sample Description			Urala Creek South Near Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			3/04/2019	2/04/2019	2/04/2019	3/04/2019	3/04/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Calcium - Dissolved	0.1	mg/L	690	740	650	660	660	
Calcium - Total	0.1	mg/L	720	740	680	680	660	
Magnesium - Dissolved	0.1	mg/L	2,000	1,900	1,900	1,900	1,900	
Magnesium - Total	0.1	mg/L	2,200	2,000	2,100	2,000	2,000	
Potassium - Dissolved	0.1	mg/L	540	510	510	520	520	
Potassium - Total	0.1	mg/L	540	510	510	520	520	
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L	<0.005	0.008	0.008	0.013	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	0.001	0.002	0.004	<0.001	
Copper - Total	0.001	mg/L	0.001	0.001	0.002	0.005	0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L	12,000	11,000	12,000	11,000	11,000	11,000
Sodium - Total	0.1	mg/L	12,000	11,000	12,000	11,000	12,000	12,000

Metals in Water			Sample No	19-05196-21	19-05196-22	19-05196-23
Sample Description			Tent Island Top	Tent Island Bottom	Locker SW	
Sample Date			3/04/2019	3/04/2019	3/04/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result
Calcium - Dissolved	0.1	mg/L	720	650	110	
Calcium - Total	0.1	mg/L	750	650	110	
Magnesium - Dissolved	0.1	mg/L	1,700	1,900	37	
Magnesium - Total	0.1	mg/L	1,600	2,000	37	

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Metals in Water			Sample No	19-05196-21	19-05196-22	19-05196-23
Sample Description			Tent Island Top	Tent Island Bottom	Locker SW	
Sample Date			3/04/2019	3/04/2019	3/04/2019	
Potassium - Dissolved	0.1	mg/L	570	520	4.8	
Potassium - Total	0.1	mg/L	570	520	4.8	
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Aluminium - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	0.015	0.006	0.008	
Zinc - Total	0.005	mg/L	0.021	0.008	0.043	
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	<0.001	
Arsenic - Total	0.001	mg/L	0.002	0.002	<0.001	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	0.002	0.003	0.20	
Copper - Total	0.001	mg/L	0.004	0.003	0.21	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	0.003	
Lead - Total	0.001	mg/L	<0.001	<0.001	0.003	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Sodium - Dissolved	0.1	mg/L	11,000	11,000	120	
Sodium - Total	0.1	mg/L	13,000	11,000	120	

Total Nitrogen in Water			Sample No	19-05196-1	19-05196-2	19-05196-3	19-05196-4	19-05196-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom	
Sample Date			2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	0.8
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	0.8

Total Nitrogen in Water			Sample No	19-05196-6	19-05196-7	19-05196-8	19-05196-9	19-05196-10
Sample Description			Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom	
Sample Date			2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	0.5	<0.2	0.3	0.3	
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	0.5	<0.2	0.3	0.3	

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Total Nitrogen in Water			Sample No	19-05196-11	19-05196-12	19-05196-13	19-05196-14	19-05196-15
Sample Description				Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom	Urala Creek South Near Top
Sample Date				3/04/2019	3/04/2019	3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Total Nitrogen in Water			Sample No	19-05196-16	19-05196-17	19-05196-18	19-05196-19	19-05196-20
Sample Description				Urala Creek South Near Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				3/04/2019	2/04/2019	2/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	0.3	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	0.3	<0.2

Total Nitrogen in Water			Sample No	19-05196-21	19-05196-22	19-05196-23
Sample Description				Tent Island Top	Tent Island Bottom	Locker SW
Sample Date				3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	<0.2	1.8	
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	

Total Phosphorus in Water			Sample No	19-05196-1	19-05196-2	19-05196-3	19-05196-4	19-05196-5
Sample Description				Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
Sample Date				2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No	19-05196-6	19-05196-7	19-05196-8	19-05196-9	19-05196-10
Sample Description				Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
Sample Date				2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No	19-05196-11	19-05196-12	19-05196-13	19-05196-14	19-05196-15
Sample Description				Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom	Urala Creek South Near Top
Sample Date				3/04/2019	3/04/2019	3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

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Total Phosphorus in Water			Sample No	19-05196-16	19-05196-17	19-05196-18	19-05196-19	19-05196-20
Sample Description				Urala Creek South Near Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				3/04/2019	2/04/2019	2/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No	19-05196-21	19-05196-22	19-05196-23
Sample Description				Tent Island Top	Tent Island Bottom	Locker SW
Sample Date				3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	0.01	0.43	

Ions by Discrete Analyser			Sample No	19-05196-1	19-05196-2	19-05196-3	19-05196-4	19-05196-5
Sample Description				Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
Sample Date				2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	70	76	78	79	74	
Chloride	5	mg/L	22,000	24,000	24,000	24,000	24,000	24,000
Sulfate	1	mg/L	3,000	3,000	3,000	3,000	3,100	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	0.02	0.02	0.03	<0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No	19-05196-6	19-05196-7	19-05196-8	19-05196-9	19-05196-10
Sample Description				Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom
Sample Date				2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	79	86	74	72	75	
Chloride	5	mg/L	24,000	24,000	24,000	20,000	24,000	24,000
Sulfate	1	mg/L	3,000	3,100	3,200	2,600	3,100	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No	19-05196-11	19-05196-12	19-05196-13	19-05196-14	19-05196-15
Sample Description				Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom	Urala Creek South Near Top
Sample Date				3/04/2019	3/04/2019	3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	81	81	70	68	86	
Chloride	5	mg/L	25,000	24,000	24,000	25,000	24,000	24,000
Sulfate	1	mg/L	3,200	3,300	2,900	2,900	3,100	

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Ions by Discrete Analyser			Sample No	19-05196-11	19-05196-12	19-05196-13	19-05196-14	19-05196-15
Sample Description				Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom	Urala Creek South Near Top
Sample Date				3/04/2019	3/04/2019	3/04/2019	3/04/2019	3/04/2019
Filterable Reactive Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	0.02
Ammonia-N	0.02	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No	19-05196-16	19-05196-17	19-05196-18	19-05196-19	19-05196-20
Sample Description				Urala Creek South Near Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				3/04/2019	2/04/2019	2/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	87	79	59	81	76	
Chloride	5	mg/L	25,000	25,000	25,000	23,000	22,000	
Sulfate	1	mg/L	3,100	2,900	3,000	2,700	2,900	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	0.02	<0.01	<0.01
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	0.02	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No	19-05196-21	19-05196-22	19-05196-23
Sample Description				Tent Island Top	Tent Island Bottom	Locker SW
Sample Date				3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Bromide	0.1	mg/L	83	64	1.5	
Chloride	5	mg/L	24,000	23,000	280	
Sulfate	1	mg/L	3,200	2,900	32	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	0.09	
Ammonia-N	0.02	mg/L	0.02	0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	1.8	
NOx-N	0.01	mg/L	<0.01	<0.01	1.8	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	

Physical Parameters			Sample No	19-05196-1	19-05196-2	19-05196-3	19-05196-4	19-05196-5
Sample Description				Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
Sample Date				2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.1	8.1	8.1	8.1	8.1	8.2
Conductivity	0.01	mS/cm	55	55	54	53	55	
Total Dissolved Solids	5	mg/L	39,000	38,000	38,000	38,000	39,000	
Total Suspended Solids	5	mg/L	14	18	8	13	18	
Turbidity	0.1	NTU	1.1	1.2	0.9	2.2	1.3	
Chlorophyll-a	1	Total µg	1	1	<1	1	<1	

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Physical Parameters			Sample No	19-05196-6	19-05196-7	19-05196-8	19-05196-9	19-05196-10
Sample Description			Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek North Near Bottom
Sample Date			2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.7	8.2	8.2	8.2	8.2	8.2
Conductivity	0.01	mS/cm	56	57	57	54	55	55
Total Dissolved Solids	5	mg/L	39,000	38,000	38,000	36,000	39,000	39,000
Total Suspended Solids	5	mg/L	16	11	17	19	23	23
Turbidity	0.1	NTU	1.3	0.6	0.7	1.7	2.8	2.8
Chlorophyll-a	1	Total µg	2	1	1	2	2	2

Physical Parameters			Sample No	19-05196-11	19-05196-12	19-05196-13	19-05196-14	19-05196-15
Sample Description			Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom	Urala Creek South Near Top	Urala Creek South Near Top
Sample Date			3/04/2019	3/04/2019	3/04/2019	3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.1	8.1	8.2	8.2	8.2	8.2
Conductivity	0.01	mS/cm	59	59	55	55	56	56
Total Dissolved Solids	5	mg/L	42,000	41,000	38,000	39,000	39,000	39,000
Total Suspended Solids	5	mg/L	15	16	9	9	5	5
Turbidity	0.1	NTU	2.1	2.1	0.5	0.7	0.9	0.9
Chlorophyll-a	1	Total µg	1	<1	<1	<1	<1	<1

Physical Parameters			Sample No	19-05196-16	19-05196-17	19-05196-18	19-05196-19	19-05196-20
Sample Description			Urala Creek South Near Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Eva Island Bottom
Sample Date			3/04/2019	2/04/2019	2/04/2019	3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.2	8.1	8.1	8.1	8.1	8.1
Conductivity	0.01	mS/cm	56	54	55	54	54	54
Total Dissolved Solids	5	mg/L	39,000	35,000	38,000	36,000	37,000	37,000
Total Suspended Solids	5	mg/L	19	13	9	<5	13	13
Turbidity	0.1	NTU	0.9	0.5	0.9	0.8	0.7	0.7
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	<1

Physical Parameters			Sample No	19-05196-21	19-05196-22	19-05196-23
Sample Description			Tent Island Top	Tent Island Bottom	Locker SW	Locker SW
Sample Date			3/04/2019	3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
pH	0.1	pH units	8.1	8.1	7.9	7.9
Conductivity	0.01	mS/cm	60	54	1.3	1.3
Total Dissolved Solids	5	mg/L	39,000	3,600	690	690
Total Suspended Solids	5	mg/L	10	12	<5	<5
Turbidity	0.1	NTU	1.8	0.5	0.1	0.1
Chlorophyll-a	1	Total µg	1	<1	<1	<1

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Biochemical Oxygen Demand			Sample No	19-05196-1	19-05196-2	19-05196-3	19-05196-4	19-05196-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Bottom
Sample Date			2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	19-05196-6	19-05196-7	19-05196-8	19-05196-9	19-05196-10
Sample Description			Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek North Near Bottom
Sample Date			2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	19-05196-11	19-05196-12	19-05196-13	19-05196-14	19-05196-15
Sample Description			Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom	Urala Creek South Near Top	Urala Creek South Near Top
Sample Date			3/04/2019	3/04/2019	3/04/2019	3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	19-05196-16	19-05196-17	19-05196-18	19-05196-19	19-05196-20
Sample Description			Urala Creek South Near Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Eva Island Bottom
Sample Date			3/04/2019	2/04/2019	2/04/2019	3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	19-05196-21	19-05196-22	19-05196-23
Sample Description			Tent Island Top	Tent Island Bottom	Locker SW	
Sample Date			3/04/2019	3/04/2019	3/04/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	

Subcontracting			Sample No	19-05196-1	19-05196-2	19-05196-3	19-05196-4	19-05196-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Bottom
Sample Date			2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	2	1	1	1	1	1
Dissolved Organic Carbon	1	mg/L	1	1	1	1	1	1

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Subcontracting			Sample No	19-05196-6	19-05196-7	19-05196-8	19-05196-9	19-05196-10
Sample Description			Locker Point Top	Urala Creek North Channel Top	Urala Creek North Channel Bottom	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek North Near Bottom
Sample Date			2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019	2/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	1	1	1	1	1
Dissolved Organic Carbon	1	mg/L	1	1	1	1	1	1

Subcontracting			Sample No	19-05196-11	19-05196-12	19-05196-13	19-05196-14	19-05196-15
Sample Description			Urala Creek South Channel Top	Urala Creek South Channel Bottom	Urala Creek South Off Top	Urala Creek South Off Bottom	Urala Creek South Off Bottom	Urala Creek South Near Top
Sample Date			3/04/2019	3/04/2019	3/04/2019	3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	2	2	1	1	1	2
Dissolved Organic Carbon	1	mg/L	2	1	1	1	1	1

Subcontracting			Sample No	19-05196-16	19-05196-17	19-05196-18	19-05196-19	19-05196-20
Sample Description			Urala Creek South Near Bottom	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Top	Eva Island Bottom
Sample Date			3/04/2019	2/04/2019	2/04/2019	3/04/2019	3/04/2019	3/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	1	1	1	1	1
Dissolved Organic Carbon	1	mg/L	1	1	1	1	1	1

Subcontracting			Sample No	19-05196-21	19-05196-22	19-05196-23
Sample Description			Tent Island Top	Tent Island Bottom	Locker SW	
Sample Date			3/04/2019	3/04/2019	3/04/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Total Organic Carbon	1	mg/L	2	<1	<1	
Dissolved Organic Carbon	1	mg/L	2	<1	<1	

Result Definitions

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting
* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

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Job Number: 19-07535
Revision: 00
Date: 28 June 2019

ADDRESS: K+S Salt

ATTENTION: Paula Cartwright

DATE RECEIVED: 20/05/2019

YOUR REFERENCE: University of WA; K+S Project

PURCHASE ORDER: K+S

APPROVALS:




 Paul Nottle Douglas Todd Sean Sangster
 Organics Manager Laboratory Manager Inorganics Supervisor

REPORT COMMENTS:

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Samples are analysed on an as received basis unless otherwise noted.

Total and Dissolved Organic Carbon analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 226913

METHOD REFERENCES:

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377
 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561
 Methods prefixed with "EDP" are covered under NATA Accreditation Number: 19290

Method ID	Method Description
ARL No. 007	Benzene, Toluene, Ethylbenzene and Xylenes in Water
ARL No. 005	Polycyclic Aromatic Hydrocarbons in Water
ARL No. 100	Organotins in Water
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 040	Arsenic by Hydride Atomic Absorption
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids
ARL No. 016	Total Suspended Solids
ARL No. 045	Turbidity
ARL No. 011	Biochemical Oxygen Demand
Subcontracting	See Report Comments section for more information.



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BTEX in Water			Sample No	19-07535-1	19-07535-2	19-07535-3	19-07535-4	19-07535-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom	
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-07535-6	19-07535-7	19-07535-8	19-07535-9	19-07535-10
Sample Description			Locker Point Top	Urala Creek North Channel	Urala Creek North Near	Urala Creek South Channel	Urala Creek South Off	
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-07535-11	19-07535-12	19-07535-13	19-07535-14	19-07535-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-07535-16	19-07535-17	19-07535-18
Sample Description			Tent Island Top	Tent Island Bottom	Locker SW	
Sample Date			14/05/2019	14/05/2019	14/05/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	

PAH in Water			Sample No	19-07535-1	19-07535-2	19-07535-3	19-07535-4	19-07535-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom	
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	19-07535-1	19-07535-2	19-07535-3	19-07535-4	19-07535-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Island Bottom	Locker Island Top
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-07535-6	19-07535-7	19-07535-8	19-07535-9	19-07535-10
Sample Description			Locker Point Top	Urala Creek North Channel	Urala Creek North Near	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Off
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-07535-11	19-07535-12	19-07535-13	19-07535-14	19-07535-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Eva Island Bottom
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	19-07535-11	19-07535-12	19-07535-13	19-07535-14	19-07535-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-07535-16	19-07535-17	19-07535-18
Sample Description			Tent Island Top	Tent Island Bottom	Locker SW	
Sample Date			14/05/2019	14/05/2019	14/05/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	

Organotins in Water			Sample No	19-07535-1	19-07535-2	19-07535-3	19-07535-4	19-07535-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom	
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

Organotins in Water			Sample No	19-07535-6	19-07535-7	19-07535-8	19-07535-9	19-07535-10
Sample Description			Locker Point Top	Urala Creek North Channel	Urala Creek North Near	Urala Creek South Channel	Urala Creek South Off	
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

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Organotins in Water			Sample No	19-07535-11	19-07535-12	19-07535-13	19-07535-14	19-07535-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

Organotins in Water			Sample No	19-07535-16	19-07535-17	19-07535-18
Sample Description			Tent Island Top	Tent Island Bottom	Locker SW	
Sample Date			14/05/2019	14/05/2019	14/05/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	
Dibutyl tin	5	ngSn/L	<5	<5	<5	
Tributyl tin	2	ngSn/L	<2	<2	<2	

Metals in Water			Sample No	19-07535-1	19-07535-2	19-07535-3	19-07535-4	19-07535-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom	
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	0.02	0.05	0.02	0.02	0.03	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	0.007	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L	0.009	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	0.001	0.002	0.002	0.002	0.002	0.002
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	650	650	660	650	550	
Calcium - Total	0.1	mg/L	680	650	660	650	570	

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Metals in Water			Sample No	19-07535-1	19-07535-2	19-07535-3	19-07535-4	19-07535-5
Sample Description				Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
Sample Date				14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
Potassium - Dissolved	0.1	mg/L		510	510	510	500	490
Potassium - Total	0.1	mg/L		520	520	540	530	490
Magnesium - Dissolved	0.1	mg/L		1,900	1,900	2,000	1,900	1,700
Magnesium - Total	0.1	mg/L		1,900	1,900	1,900	1,900	1,700
Sodium - Dissolved	0.1	mg/L		10,000	10,000	10,000	10,000	10,000
Sodium - Total	0.1	mg/L		10,000	10,000	10,000	10,000	10,000

Metals in Water			Sample No	19-07535-6	19-07535-7	19-07535-8	19-07535-9	19-07535-10
Sample Description				Locker Point Top	Urala Creek North Channel	Urala Creek North Near	Urala Creek South Channel	Urala Creek South Off
Sample Date				14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	0.05	<0.01	0.02	<0.01	<0.01	0.02
Aluminium - Total	0.01	mg/L	0.05	0.01	0.02	<0.01	<0.01	0.02
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	0.016	<0.005	<0.005	<0.005	<0.005	0.010
Zinc - Total	0.005	mg/L	0.022	<0.005	<0.005	0.007	0.007	0.023
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	0.001	0.001	0.002	0.002	0.002	0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	640	650	600	670	640	
Calcium - Total	0.1	mg/L	640	650	610	670	640	
Potassium - Dissolved	0.1	mg/L	500	530	470	500	510	
Potassium - Total	0.1	mg/L	530	530	550	500	520	
Magnesium - Dissolved	0.1	mg/L	1,900	1,600	1,700	1,600	1,900	
Magnesium - Total	0.1	mg/L	1,900	1,700	1,900	1,600	1,900	
Sodium - Dissolved	0.1	mg/L	10,000	10,000	10,000	10,000	10,000	
Sodium - Total	0.1	mg/L	10,000	10,000	10,000	11,000	10,000	

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Metals in Water			Sample No	19-07535-11	19-07535-12	19-07535-13	19-07535-14	19-07535-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	0.06	0.04	<0.01	0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	0.06	0.04	0.01	0.01	0.02	0.02
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	0.005	<0.005	<0.005	<0.005	0.005
Zinc - Total	0.005	mg/L	0.005	0.007	<0.005	<0.005	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	0.001	0.002	0.001	0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	670	610	650	610	650	650
Calcium - Total	0.1	mg/L	670	610	650	610	650	650
Potassium - Dissolved	0.1	mg/L	470	480	490	470	500	500
Potassium - Total	0.1	mg/L	570	580	530	500	500	500
Magnesium - Dissolved	0.1	mg/L	1,900	1,600	1,900	1,700	1,900	1,900
Magnesium - Total	0.1	mg/L	1,900	1,600	1,900	1,900	1,900	1,900
Sodium - Dissolved	0.1	mg/L	9,800	9,900	10,000	10,000	10,000	10,000
Sodium - Total	0.1	mg/L	10,000	10,000	10,000	10,000	10,000	10,000

Metals in Water			Sample No	19-07535-16	19-07535-17	19-07535-18
Sample Description			Tent Island Top	Tent Island Bottom	Locker SW	
Sample Date			14/05/2019	14/05/2019	14/05/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Aluminium - Dissolved	0.01	mg/L	0.02	<0.01	<0.01	
Aluminium - Total	0.01	mg/L	0.02	<0.01	0.01	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	

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Metals in Water			Sample No	19-07535-16	19-07535-17	19-07535-18
Sample Description			Tent Island Top	Tent Island Bottom	Locker SW	
Sample Date			14/05/2019	14/05/2019	14/05/2019	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	0.014	<0.005	0.027	
Zinc - Total	0.005	mg/L	0.018	0.006	0.031	
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	<0.001	
Arsenic - Total	0.001	mg/L	0.002	0.002	<0.001	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	0.084	
Copper - Total	0.001	mg/L	<0.001	<0.001	0.094	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Calcium - Dissolved	0.1	mg/L	580	550	83	
Calcium - Total	0.1	mg/L	600	600	90	
Potassium - Dissolved	0.1	mg/L	490	460	4.3	
Potassium - Total	0.1	mg/L	500	540	4.9	
Magnesium - Dissolved	0.1	mg/L	1,900	1,700	36	
Magnesium - Total	0.1	mg/L	1,900	1,900	39	
Sodium - Dissolved	0.1	mg/L	10,000	10,000	120	
Sodium - Total	0.1	mg/L	11,000	10,000	120	

Total Nitrogen in Water			Sample No	19-07535-1	19-07535-2	19-07535-3	19-07535-4	19-07535-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom	
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Total Nitrogen in Water			Sample No	19-07535-6	19-07535-7	19-07535-8	19-07535-9	19-07535-10
Sample Description			Locker Point Top	Urala Creek North Channel	Urala Creek North Near	Urala Creek South Channel	Urala Creek South Off	
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

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Total Nitrogen in Water			Sample No	19-07535-11	19-07535-12	19-07535-13	19-07535-14	19-07535-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Total Nitrogen in Water			Sample No	19-07535-16	19-07535-17	19-07535-18
Sample Description				Tent Island Top	Tent Island Bottom	Locker SW
Sample Date				14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	<0.2	1.8	
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	

Total Phosphorus in Water			Sample No	19-07535-1	19-07535-2	19-07535-3	19-07535-4	19-07535-5
Sample Description				Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
Sample Date				14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No	19-07535-6	19-07535-7	19-07535-8	19-07535-9	19-07535-10
Sample Description				Locker Point Top	Urala Creek North Channel	Urala Creek North Near	Urala Creek South Channel	Urala Creek South Off
Sample Date				14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No	19-07535-11	19-07535-12	19-07535-13	19-07535-14	19-07535-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No	19-07535-16	19-07535-17	19-07535-18
Sample Description				Tent Island Top	Tent Island Bottom	Locker SW
Sample Date				14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	<0.01	0.42	

Ions by Discrete Analyser			Sample No	19-07535-1	19-07535-2	19-07535-3	19-07535-4	19-07535-5
Sample Description				Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
Sample Date				14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	81	74	76	89	97	
Chloride	5	mg/L	22,000	21,000	21,000	21,000	21,000	21,000
Sulfate	1	mg/L	2,800	2,600	2,700	2,500	2,700	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

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Ions by Discrete Analyser			Sample No	19-07535-1	19-07535-2	19-07535-3	19-07535-4	19-07535-5
Sample Description				Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
Sample Date				14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
Nitrate-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No	19-07535-6	19-07535-7	19-07535-8	19-07535-9	19-07535-10
Sample Description				Locker Point Top	Urala Creek North Channel	Urala Creek North Near	Urala Creek South Channel	Urala Creek South Off
Sample Date				14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	78	86	79	87	83	
Chloride	5	mg/L	22,000	22,000	21,000	21,000	22,000	
Sulfate	1	mg/L	2,700	2,800	2,800	3,300	2,600	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	

Ions by Discrete Analyser			Sample No	19-07535-11	19-07535-12	19-07535-13	19-07535-14	19-07535-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	76	72	72	81	90	
Chloride	5	mg/L	22,000	20,000	20,000	20,000	20,000	
Sulfate	1	mg/L	2,700	2,700	2,700	2,800	2,800	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	

Ions by Discrete Analyser			Sample No	19-07535-16	19-07535-17	19-07535-18
Sample Description				Tent Island Top	Tent Island Bottom	Locker SW
Sample Date				14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Bromide	0.1	mg/L	83	85	7.5	
Chloride	5	mg/L	21,000	21,000	250	
Sulfate	1	mg/L	2,700	2,500	28	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	0.07	
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	1.8	
NOx-N	0.01	mg/L	<0.01	<0.01	1.8	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	

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Physical Parameters			Sample No	19-07535-1	19-07535-2	19-07535-3	19-07535-4	19-07535-5
Sample Description				Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
Sample Date				14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.1	8.2	8.1	8.1	8.1	8.1
Conductivity	0.01	mS/cm	57	56	57	56	58	58
Total Dissolved Solids	5	mg/L	38,000	34,000	35,000	33,000	37,000	37,000
Total Suspended Solids	5	mg/L	<5	<5	<5	5	32	32
Turbidity	0.1	NTU	0.6	0.2	1.3	0.1	2.0	2.0

Physical Parameters			Sample No	19-07535-6	19-07535-7	19-07535-8	19-07535-9	19-07535-10
Sample Description				Locker Point Top	Urala Creek North Channel	Urala Creek North Near	Urala Creek South Channel	Urala Creek South Off
Sample Date				14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.1	8.1	8.1	8.1	8.1	8.1
Conductivity	0.01	mS/cm	57	59	56	65	57	57
Total Dissolved Solids	5	mg/L	37,000	39,000	37,000	42,000	38,000	38,000
Total Suspended Solids	5	mg/L	24	10	10	11	16	16
Turbidity	0.1	NTU	0.9	1.3	0.7	2.0	1.2	1.2

Physical Parameters			Sample No	19-07535-11	19-07535-12	19-07535-13	19-07535-14	19-07535-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.1	8.2	8.2	8.2	8.2	8.2
Conductivity	0.01	mS/cm	57	56	56	55	56	56
Total Dissolved Solids	5	mg/L	40,000	39,000	38,000	36,000	37,000	37,000
Total Suspended Solids	5	mg/L	<5	7	6	<5	5	5
Turbidity	0.1	NTU	0.8	0.4	0.7	0.1	0.3	0.3

Physical Parameters			Sample No	19-07535-16	19-07535-17	19-07535-18
Sample Description				Tent Island Top	Tent Island Bottom	Locker SW
Sample Date				14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
pH	0.1	pH units	8.2	8.1	7.6	7.6
Conductivity	0.01	mS/cm	57	57	1.3	1.3
Total Dissolved Solids	5	mg/L	40,000	36,000	780	780
Total Suspended Solids	5	mg/L	9	<5	<5	<5
Turbidity	0.1	NTU	0.6	1.0	0.2	0.2

Biochemical Oxygen Demand			Sample No	19-07535-1	19-07535-2	19-07535-3	19-07535-4	19-07535-5
Sample Description				Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Point Bottom
Sample Date				14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

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Biochemical Oxygen Demand			Sample No	19-07535-6	19-07535-7	19-07535-8	19-07535-9	19-07535-10
Sample Description			Locker Point Top	Urala Creek North Channel	Urala Creek North Channel	Urala Creek North Channel	Urala Creek South Channel	Urala Creek South Off
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	19-07535-11	19-07535-12	19-07535-13	19-07535-14	19-07535-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Eva Island Bottom
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	19-07535-16	19-07535-17	19-07535-18
Sample Description			Tent Island Top	Tent Island Bottom	Locker SW	
Sample Date			14/05/2019	14/05/2019	14/05/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	

Subcontracting			Sample No	19-07535-1	19-07535-2	19-07535-3	19-07535-4	19-07535-5
Sample Description			Rocky Point Bottom	Rocky Point Top	Locker Island Bottom	Locker Island Top	Locker Island Bottom	Locker Point Bottom
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	<1	<1	<1	<1	<1
Dissolved Organic Carbon	1	mg/L	1	<1	<1	<1	<1	<1

Subcontracting			Sample No	19-07535-6	19-07535-7	19-07535-8	19-07535-9	19-07535-10
Sample Description			Locker Point Top	Urala Creek North Channel	Urala Creek North Near	Urala Creek North Channel	Urala Creek South Channel	Urala Creek South Off
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	1	1	2	<1	<1
Dissolved Organic Carbon	1	mg/L	<1	1	1	2	<1	<1

Subcontracting			Sample No	19-07535-11	19-07535-12	19-07535-13	19-07535-14	19-07535-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Eva Island Bottom
Sample Date			14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	1	<1	<1	<1	<1
Dissolved Organic Carbon	1	mg/L	<1	1	<1	<1	<1	<1

Subcontracting			Sample No	19-07535-16	19-07535-17	19-07535-18
Sample Description			Tent Island Top	Tent Island Bottom	Locker SW	
Sample Date			14/05/2019	14/05/2019	14/05/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Total Organic Carbon	1	mg/L	1	1	<1	
Dissolved Organic Carbon	1	mg/L	1	1	<1	

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Result Definitions

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting

* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

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Job Number: 19-10366
Revision: 00
Date: 1 August 2019

ADDRESS: K+S Salt


ATTENTION: Paula Cartwright

DATE RECEIVED: 1/07/2019


YOUR REFERENCE: University of WA; K+S Project

PURCHASE ORDER: K+S

APPROVALS:



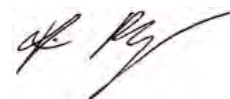
Andrew Harvey
Resources Manager



Min How
Organics Supervisor



Paul Nottle
Organics Manager



Kim Rodgers
General Manager



Sean Sangster
Inorganics Supervisor

REPORT COMMENTS:

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Samples are analysed on an as received basis unless otherwise noted.

Total and Dissolved Organic Carbon analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 229088

METHOD REFERENCES:

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377
 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561
 Methods prefixed with "EDP" are covered under NATA Accreditation Number: 19290

Method ID	Method Description
ARL No. 007	Benzene, Toluene, Ethylbenzene and Xylenes in Water
ARL No. 005	Polycyclic Aromatic Hydrocarbons in Water
ARL No. 100	Organotins in Water
ARL No. 029	Metals in Water by AAS
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 040	Arsenic by Hydride Atomic Absorption
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids



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Method ID	Method Description
ARL No. 016	Total Suspended Solids
ARL No. 045	Turbidity
ARL No. 141	Chlorophyll-a and Pheophytin-a in Water
ARL No. 011	Biochemical Oxygen Demand
Subcontracting	See Report Comments section for more information.

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BTEX in Water			Sample No	19-10366-1	19-10366-2	19-10366-3	19-10366-4	19-10366-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Locker Point Top
Sample Date			30/06/2019	29/06/2019	29/06/2019	29/06/2019	29/06/2019	29/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-10366-6	19-10366-7	19-10366-8	19-10366-9	19-10366-10
Sample Description			Urala Creek North channel	Urala Creek North near top	Urala Creek North near bottom	Urala Creek South channel	Urala Creek South off	Urala Creek South off
Sample Date			30/06/2019	30/06/2019	30/06/2019	30/06/2019	30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-10366-11	19-10366-12	19-10366-13	19-10366-14	19-10366-15
Sample Description			Urala Creek South near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Eva Island Bottom
Sample Date			30/06/2019	29/06/2019	29/06/2019	30/06/2019	30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-10366-16	19-10366-17
Sample Description			Tent Island	Locker SW	
Sample Date			30/06/2019	30/06/2019	
ANALYTE	LOR	Units	Result	Result	
Benzene	0.001	mg/L	<0.001	<0.001	
Toluene	0.001	mg/L	<0.001	<0.001	
Ethylbenzene	0.001	mg/L	<0.001	<0.001	
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	

PAH in Water			Sample No	19-10366-1	19-10366-2	19-10366-3	19-10366-4	19-10366-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Locker Point Top
Sample Date			30/06/2019	29/06/2019	29/06/2019	29/06/2019	29/06/2019	29/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	19-10366-1	19-10366-2	19-10366-3	19-10366-4	19-10366-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				30/06/2019	29/06/2019	29/06/2019	29/06/2019	29/06/2019
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-10366-6	19-10366-7	19-10366-8	19-10366-9	19-10366-10
Sample Description				Urala Creek North channel	Urala Creek North near top	Urala Creek North near bottom	Urala Creek South channel	Urala Creek South off
Sample Date				30/06/2019	30/06/2019	30/06/2019	30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-10366-11	19-10366-12	19-10366-13	19-10366-14	19-10366-15
Sample Description				Urala Creek South near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				30/06/2019	29/06/2019	29/06/2019	30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	19-10366-11	19-10366-12	19-10366-13	19-10366-14	19-10366-15
Sample Description			Urala Creek South near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			30/06/2019	29/06/2019	29/06/2019	30/06/2019	30/06/2019	
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-10366-16	19-10366-17
Sample Description			Tent Island	Locker SW	
Sample Date			30/06/2019	30/06/2019	
ANALYTE	LOR	Units	Result	Result	
Naphthalene	0.1	µg/L	<0.1	<0.1	
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	
Acenaphthylene	0.1	µg/L	<0.1	<0.1	
Acenaphthene	0.1	µg/L	<0.1	<0.1	
Fluorene	0.1	µg/L	<0.1	<0.1	
Phenanthrene	0.1	µg/L	<0.1	<0.1	
Anthracene	0.1	µg/L	<0.1	<0.1	
Fluoranthene	0.1	µg/L	<0.1	<0.1	
Pyrene	0.1	µg/L	<0.1	<0.1	
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	
Chrysene	0.1	µg/L	<0.1	<0.1	
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	

Organotins in Water			Sample No	19-10366-1	19-10366-2	19-10366-3	19-10366-4	19-10366-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			30/06/2019	29/06/2019	29/06/2019	29/06/2019	29/06/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

Organotins in Water			Sample No	19-10366-6	19-10366-7	19-10366-8	19-10366-9	19-10366-10
Sample Description			Urala Creek North channel	Urala Creek North near top	Urala Creek North near bottom	Urala Creek South channel	Urala Creek South off	
Sample Date			30/06/2019	30/06/2019	30/06/2019	30/06/2019	30/06/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

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Organotins in Water			Sample No	19-10366-11	19-10366-12	19-10366-13	19-10366-14	19-10366-15
Sample Description			Urala Creek South near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			30/06/2019	29/06/2019	29/06/2019	30/06/2019	30/06/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

Organotins in Water			Sample No	19-10366-16	19-10366-17
Sample Description			Tent Island	Locker SW	
Sample Date			30/06/2019	30/06/2019	
ANALYTE	LOR	Units	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	
Dibutyl tin	5	ngSn/L	<5	<5	
Tributyl tin	2	ngSn/L	<2	<2	

Metals in Water			Sample No	19-10366-1	19-10366-2	19-10366-3	19-10366-4	19-10366-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			30/06/2019	29/06/2019	29/06/2019	29/06/2019	29/06/2019	29/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Calcium - Dissolved	0.1	mg/L	560	530	530	520	540	
Calcium - Total	0.1	mg/L	560	530	530	530	540	
Magnesium - Dissolved	0.1	mg/L	1,300	1,400	1,400	1,500	1,400	
Magnesium - Total	0.1	mg/L	1,400	1,700	1,500	1,500	1,400	
Potassium - Dissolved	0.1	mg/L	530	520	510	520	520	
Potassium - Total	0.1	mg/L	530	520	510	520	520	
Aluminium - Dissolved	0.01	mg/L	0.06	<0.01	<0.01	0.01	<0.01	
Aluminium - Total	0.01	mg/L	0.06	<0.01	0.02	0.01	0.18	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	0.005	0.007	<0.005	<0.005	<0.005	
Zinc - Total	0.005	mg/L	0.010	0.016	<0.005	<0.005	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	0.007	<0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	

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Metals in Water			Sample No	19-10366-1	19-10366-2	19-10366-3	19-10366-4	19-10366-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			30/06/2019	29/06/2019	29/06/2019	29/06/2019	29/06/2019	29/06/2019
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Sodium - Dissolved	0.1	mg/L	11,000	10,000	10,000	11,000	10,000	10,000
Sodium - Total	0.1	mg/L	11,000	10,000	11,000	11,000	11,000	11,000

Metals in Water			Sample No	19-10366-6	19-10366-7	19-10366-8	19-10366-9	19-10366-10
Sample Description			Urala Creek North channel	Urala Creek North near top	Urala Creek North near bottom	Urala Creek South channel	Urala Creek South off	
Sample Date			30/06/2019	30/06/2019	30/06/2019	30/06/2019	30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Calcium - Dissolved	0.1	mg/L	540	530	540	550	540	
Calcium - Total	0.1	mg/L	540	530	540	580	550	
Magnesium - Dissolved	0.1	mg/L	1,400	1,400	1,400	1,400	1,400	
Magnesium - Total	0.1	mg/L	1,400	1,400	1,500	1,600	1,500	
Potassium - Dissolved	0.1	mg/L	520	510	520	530	530	
Potassium - Total	0.1	mg/L	520	510	520	530	530	
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.03	
Aluminium - Total	0.01	mg/L	0.09	0.18	0.21	0.06	0.08	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	0.005	<0.005	<0.005	0.005	<0.005	
Zinc - Total	0.005	mg/L	0.005	0.017	0.089	0.014	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.001	0.002	
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.001	0.002	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	0.003	<0.001	
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	0.003	<0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	0.001	0.001	0.001	0.001	0.001	
Selenium - Total	0.001	mg/L	0.001	0.001	0.001	0.001	0.001	
Sodium - Dissolved	0.1	mg/L	11,000	11,000	11,000	11,000	10,000	

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Metals in Water			Sample No	19-10366-6	19-10366-7	19-10366-8	19-10366-9	19-10366-10
Sample Description			Urala Creek North channel	Urala Creek North near top	Urala Creek North near bottom	Urala Creek South channel	Urala Creek South off	
Sample Date			30/06/2019	30/06/2019	30/06/2019	30/06/2019	30/06/2019	30/06/2019
Sodium - Total	0.1	mg/L	11,000	11,000	11,000	12,000	11,000	

Metals in Water			Sample No	19-10366-11	19-10366-12	19-10366-13	19-10366-14	19-10366-15
Sample Description			Urala Creek South near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			30/06/2019	29/06/2019	29/06/2019	30/06/2019	30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Calcium - Dissolved	0.1	mg/L	550	530	530	520	530	
Calcium - Total	0.1	mg/L	560	530	540	530	550	
Magnesium - Dissolved	0.1	mg/L	1,500	1,300	1,500	1,500	1,400	
Magnesium - Total	0.1	mg/L	1,600	1,300	1,500	1,500	1,600	
Potassium - Dissolved	0.1	mg/L	530	520	510	500	510	
Potassium - Total	0.1	mg/L	530	520	510	500	510	
Aluminium - Dissolved	0.01	mg/L	0.02	<0.01	<0.01	<0.01	<0.01	
Aluminium - Total	0.01	mg/L	0.18	0.08	0.10	0.02	<0.01	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	0.008	<0.005	
Zinc - Total	0.005	mg/L	0.041	0.021	0.006	0.005	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.003	0.002	
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.003	0.002	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Total	0.001	mg/L	0.001	<0.001	0.017	<0.001	<0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	0.001	0.001	0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	0.001	0.001	0.001	<0.001	<0.001	
Sodium - Dissolved	0.1	mg/L	10,000	10,000	10,000	10,000	10,000	
Sodium - Total	0.1	mg/L	11,000	12,000	11,000	11,000	11,000	

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Metals in Water			Sample No	19-10366-16	19-10366-17
			Sample Description	Tent Island	Locker SW
			Sample Date	30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	
Calcium - Dissolved	0.1	mg/L	540	0.3	
Calcium - Total	0.1	mg/L	550	1.9	
Magnesium - Dissolved	0.1	mg/L	1,400	1.8	
Magnesium - Total	0.1	mg/L	1,500	1.8	
Potassium - Dissolved	0.1	mg/L	520	<0.1	
Potassium - Total	0.1	mg/L	520	1.2	
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	
Aluminium - Total	0.01	mg/L	0.03	0.05	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	
Zinc - Total	0.005	mg/L	0.045	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.002	<0.001	
Arsenic - Total	0.001	mg/L	0.002	<0.001	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	
Copper - Total	0.001	mg/L	<0.001	0.009	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	0.001	<0.001	
Nickel - Total	0.001	mg/L	0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	0.001	<0.001	
Selenium - Total	0.001	mg/L	0.001	<0.001	
Sodium - Dissolved	0.1	mg/L	11,000	0.7	
Sodium - Total	0.1	mg/L	11,000	1.6	

Total Nitrogen in Water			Sample No	19-10366-1	19-10366-2	19-10366-3	19-10366-4	19-10366-5
			Sample Description	Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
			Sample Date	30/06/2019	29/06/2019	29/06/2019	29/06/2019	29/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Total Nitrogen	0.2	mg/L	<0.2	1.8	<0.2	1.0	2.4	
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	1.8	<0.2	1.0	2.4	

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Total Nitrogen in Water			Sample No	19-10366-6	19-10366-7	19-10366-8	19-10366-9	19-10366-10
Sample Description			Urala Creek North channel	Urala Creek North near top	Urala Creek North near bottom	Urala Creek South channel	Urala Creek South off	
Sample Date			30/06/2019	30/06/2019	30/06/2019	30/06/2019	30/06/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Total Nitrogen in Water			Sample No	19-10366-11	19-10366-12	19-10366-13	19-10366-14	19-10366-15
Sample Description			Urala Creek South near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			30/06/2019	29/06/2019	29/06/2019	30/06/2019	30/06/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	0.2	<0.2	<0.2	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	0.2	<0.2	<0.2	<0.2	<0.2

Total Nitrogen in Water			Sample No	19-10366-16	19-10366-17
Sample Description			Tent Island	Locker SW	
Sample Date			30/06/2019	30/06/2019	
ANALYTE	LOR	Units	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2

Total Phosphorus in Water			Sample No	19-10366-1	19-10366-2	19-10366-3	19-10366-4	19-10366-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			30/06/2019	29/06/2019	29/06/2019	29/06/2019	29/06/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.02	0.01	<0.01	<0.01	<0.01	0.02

Total Phosphorus in Water			Sample No	19-10366-6	19-10366-7	19-10366-8	19-10366-9	19-10366-10
Sample Description			Urala Creek North channel	Urala Creek North near top	Urala Creek North near bottom	Urala Creek South channel	Urala Creek South off	
Sample Date			30/06/2019	30/06/2019	30/06/2019	30/06/2019	30/06/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.01	0.01	0.02	0.01	0.02	

Total Phosphorus in Water			Sample No	19-10366-11	19-10366-12	19-10366-13	19-10366-14	19-10366-15
Sample Description			Urala Creek South near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			30/06/2019	29/06/2019	29/06/2019	30/06/2019	30/06/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.01	0.02	0.02	0.01	<0.01	

Total Phosphorus in Water			Sample No	19-10366-16	19-10366-17
Sample Description			Tent Island	Locker SW	
Sample Date			30/06/2019	30/06/2019	
ANALYTE	LOR	Units	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.02	<0.01	<0.01

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Ions by Discrete Analyser			Sample No	19-10366-1	19-10366-2	19-10366-3	19-10366-4	19-10366-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				30/06/2019	29/06/2019	29/06/2019	29/06/2019	29/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	74	82	65	58	70	
Chloride	5	mg/L	21,000	21,000	21,000	22,000	21,000	
Sulfate	1	mg/L	2,700	2,600	2,700	2,800	2,700	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Ammonia-N	0.02	mg/L	<0.02	1.7	<0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	

Ions by Discrete Analyser			Sample No	19-10366-6	19-10366-7	19-10366-8	19-10366-9	19-10366-10
Sample Description				Urala Creek North channel	Urala Creek North near top	Urala Creek North near bottom	Urala Creek South channel	Urala Creek South off
Sample Date				30/06/2019	30/06/2019	30/06/2019	30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	69	63	72	68	60	
Chloride	5	mg/L	22,000	22,000	22,000	22,000	21,000	
Sulfate	1	mg/L	2,800	2,800	2,600	2,700	2,800	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	

Ions by Discrete Analyser			Sample No	19-10366-11	19-10366-12	19-10366-13	19-10366-14	19-10366-15
Sample Description				Urala Creek South near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				30/06/2019	29/06/2019	29/06/2019	30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	67	69	65	65	69	
Chloride	5	mg/L	21,000	21,000	21,000	21,000	21,000	
Sulfate	1	mg/L	2,800	2,700	2,700	2,700	2,800	
Filterable Reactive Phosphorus	0.01	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	
Ammonia-N	0.02	mg/L	<0.02	<0.02	0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	

Ions by Discrete Analyser			Sample No	19-10366-16	19-10366-17
Sample Description				Tent Island	Locker SW
Sample Date				30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	Result
Bromide	0.1	mg/L	70	<0.1	
Chloride	5	mg/L	21,000	<5	
Sulfate	1	mg/L	2,900	<1	

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Ions by Discrete Analyser			Sample No	19-10366-16	19-10366-17
Sample Description				Tent Island	Locker SW
Sample Date				30/06/2019	30/06/2019
Filterable Reactive Phosphorus	0.01	mg/L		<0.01	<0.01
Ammonia-N	0.02	mg/L		<0.02	<0.02
Nitrate-N	0.01	mg/L		<0.01	<0.01
NOx-N	0.01	mg/L		<0.01	<0.01
Nitrite-N	0.01	mg/L		<0.01	<0.01

Physical Parameters			Sample No	19-10366-1	19-10366-2	19-10366-3	19-10366-4	19-10366-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				30/06/2019	29/06/2019	29/06/2019	29/06/2019	29/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.1	8.2	8.2	8.1	8.2	8.2
Conductivity	0.01	mS/cm	52	52	51	51	52	52
Total Dissolved Solids	5	mg/L	41,000	38,000	40,000	40,000	40,000	40,000
Total Suspended Solids	5	mg/L	7	7	7	7	7	<5
Turbidity	0.1	NTU	5.6	2.5	2.1	7.0	5.3	5.3
Chlorophyll-a	1	Total µg	<1	<1	<1	1	1	1

Physical Parameters			Sample No	19-10366-6	19-10366-7	19-10366-8	19-10366-9	19-10366-10
Sample Description				Urala Creek North channel	Urala Creek North near top	Urala Creek North near bottom	Urala Creek South channel	Urala Creek South off
Sample Date				30/06/2019	30/06/2019	30/06/2019	30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.1	8.2	8.2	8.1	8.2	8.2
Conductivity	0.01	mS/cm	52	52	51	53	53	53
Total Dissolved Solids	5	mg/L	41,000	40,000	39,000	41,000	41,000	41,000
Total Suspended Solids	5	mg/L	6	6	7	6	<5	<5
Turbidity	0.1	NTU	2.2	3.9	4.5	2.0	2.2	2.2
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	<1

Physical Parameters			Sample No	19-10366-11	19-10366-12	19-10366-13	19-10366-14	19-10366-15
Sample Description				Urala Creek South near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				30/06/2019	29/06/2019	29/06/2019	30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.1	8.2	8.2	8.2	8.2	8.2
Conductivity	0.01	mS/cm	53	53	52	51	51	51
Total Dissolved Solids	5	mg/L	41,000	40,000	41,000	40,000	39,000	39,000
Total Suspended Solids	5	mg/L	8	<5	<5	5	5	5
Turbidity	0.1	NTU	4.7	2.0	3.0	<0.1	0.6	0.6
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	<1

Physical Parameters			Sample No	19-10366-16	19-10366-17
Sample Description				Tent Island	Locker SW
Sample Date				30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	Result
pH	0.1	pH units	8.2	6.7	6.7
Conductivity	0.01	mS/cm	53	<0.01	<0.01
Total Dissolved Solids	5	mg/L	39,000	<5	<5

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Physical Parameters			Sample No	19-10366-16	19-10366-17
Sample Description				Tent Island	Locker SW
Sample Date				30/06/2019	30/06/2019
Total Suspended Solids	5	mg/L		6	<5
Turbidity	0.1	NTU		5.2	<0.1
Chlorophyll-a	1	Total µg		<1	<1

Biochemical Oxygen Demand			Sample No	19-10366-1	19-10366-2	19-10366-3	19-10366-4	19-10366-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				30/06/2019	29/06/2019	29/06/2019	29/06/2019	29/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	19-10366-6	19-10366-7	19-10366-8	19-10366-9	19-10366-10
Sample Description				Urala Creek North channel	Urala Creek North near top	Urala Creek North near bottom	Urala Creek South channel	Urala Creek South off
Sample Date				30/06/2019	30/06/2019	30/06/2019	30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	19-10366-11	19-10366-12	19-10366-13	19-10366-14	19-10366-15
Sample Description				Urala Creek South near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				30/06/2019	29/06/2019	29/06/2019	30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	19-10366-16	19-10366-17
Sample Description				Tent Island	Locker SW
Sample Date				30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5

Subcontracting			Sample No	19-10366-1	19-10366-2	19-10366-3	19-10366-4	19-10366-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				30/06/2019	29/06/2019	29/06/2019	29/06/2019	29/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	1	<1	<1	<1	<1
Dissolved Organic Carbon	1	mg/L	<1	<1	<1	<1	<1	<1

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Subcontracting			Sample No	19-10366-6	19-10366-7	19-10366-8	19-10366-9	19-10366-10
Sample Description			Urala Creek North channel	Urala Creek North near top	Urala Creek North near bottom	Urala Creek South channel	Urala Creek South off	
Sample Date			30/06/2019	30/06/2019	30/06/2019	30/06/2019	30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	<1	<1	<1	<1	<1
Dissolved Organic Carbon	1	mg/L	<1	<1	<1	<1	<1	<1

Subcontracting			Sample No	19-10366-11	19-10366-12	19-10366-13	19-10366-14	19-10366-15
Sample Description			Urala Creek South near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			30/06/2019	29/06/2019	29/06/2019	30/06/2019	30/06/2019	30/06/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	<1	<1	<1	<1	<1
Dissolved Organic Carbon	1	mg/L	<1	<1	<1	<1	<1	<1

Subcontracting			Sample No	19-10366-16	19-10366-17
Sample Description			Tent Island	Locker SW	
Sample Date			30/06/2019	30/06/2019	
ANALYTE	LOR	Units	Result	Result	
Total Organic Carbon	1	mg/L	<1	<1	
Dissolved Organic Carbon	1	mg/L	<1	<1	

Result Definitions

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting
* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

July Data copied from excel

Reference	Description	Sample Description	Sample Date	Sample No.	Replicate	QC Type	Sample Matrix	Sample Notes	Benzene
Units									mg/L
PQL									0.001
Method									ARL No. 007
19-11641	University of WA; K+S Project	Rocky Point	17/07/2019 0:00	1	0	Regular	Water		<0.001
19-11641	University of WA; K+S Project	Locker Island Bottom	17/07/2019 0:00	2	0	Regular	Water		<0.001
19-11641	University of WA; K+S Project	Locker Island Top	17/07/2019 0:00	3	0	Regular	Water		<0.001
19-11641	University of WA; K+S Project	Locker Point Bottom	16/07/2019 0:00	4	0	Regular	Water		<0.001
19-11641	University of WA; K+S Project	Locker Point Top	16/07/2019 0:00	5	0	Regular	Water		<0.001
19-11641	University of WA; K+S Project	Urala Creek North Channel	17/07/2019 0:00	6	0	Regular	Water		<0.001
19-11641	University of WA; K+S Project	Urala Creek North Near Top	17/07/2019 0:00	7	0	Regular	Water		<0.001
19-11641	University of WA; K+S Project	Urala Creek North Near Bottom	17/07/2019 0:00	8	0	Regular	Water		<0.001
19-11641	University of WA; K+S Project	Urala Creek South Channel	16/07/2019 0:00	9	0	Regular	Water		<0.001
19-11641	University of WA; K+S Project	Urala Creek South Off	16/07/2019 0:00	10	0	Regular	Water		<0.001
19-11641	University of WA; K+S Project	Urala Creek Sourth Near	16/07/2019 0:00	11	0	Regular	Water		<0.001
19-11641	University of WA; K+S Project	Fly Island Top	17/07/2019 0:00	12	0	Regular	Water		<0.001
19-11641	University of WA; K+S Project	Fly Island Bottom	17/07/2019 0:00	13	0	Regular	Water		<0.001
19-11641	University of WA; K+S Project	Eva Island Top	16/07/2019 0:00	14	0	Regular	Water		<0.001
19-11641	University of WA; K+S Project	Eva Island Bottom	16/07/2019 0:00	15	0	Regular	Water		<0.001
19-11641	University of WA; K+S Project	Tent Island Top	16/07/2019 0:00	16	0	Regular	Water		<0.001
19-11641	University of WA; K+S Project	Locker SW	16/07/2019 0:00	17	0	Regular	Water		<0.001
19-11641	University of WA; K+S Project	Tent Island Bottom	16/07/2019 0:00	18	0	Regular	Water		<0.001

Vanadium - Dissolved	Vanadium - Total	Zinc - Dissolved	Zinc - Total	Arsenic - Dissolved	Arsenic - Total	Chromium - Dissolved
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
0.01	0.01	0.005	0.005	0.001	0.001	0.001
ARL No. 29/402/403	ARL No. 29/402/403	ARL No. 29/402/403	ARL No. 29/402/403	ARL No. 040	ARL No. 29/402/403	ARL No. 29/402/403
<0.01	<0.01	<0.005	0.019	0.001	0.001	<0.001
<0.01	<0.01	<0.005	0.017	0.001	0.002	<0.001
<0.01	<0.01	0.006	0.015	0.001	0.002	<0.001
<0.01	<0.01	0.006	0.015	0.001	0.002	<0.001
<0.01	<0.01	0.006	0.018	0.001	0.001	<0.001
<0.01	<0.01	0.005	0.017	0.001	0.001	<0.001
<0.01	<0.01	<0.005	0.016	0.001	0.002	<0.001
<0.01	<0.01	<0.005	0.027	0.001	0.001	<0.001
<0.01	<0.01	<0.005	0.016	0.001	0.001	<0.001
<0.01	<0.01	<0.005	0.019	0.001	0.001	<0.001
<0.01	<0.01	<0.005	0.062	0.001	0.001	<0.001
<0.01	<0.01	<0.005	0.019	0.002	0.002	<0.001
<0.01	<0.01	0.008	0.03	0.002	0.002	<0.001
<0.01	<0.01	<0.005	0.023	0.002	0.002	<0.001
<0.01	<0.01	<0.005	0.015	0.002	0.002	<0.001
<0.01	<0.01	<0.005	0.018	0.001	0.002	<0.001
<0.01	<0.01	<0.005	0.028	<0.001	<0.001	<0.001
<0.01	<0.01	<0.005	0.019	0.001	0.001	<0.001

Selenium - Total	Calcium - Dissolved	Calcium - Total	Potassium - Dissolved	Potassium - Total	Magnesium - Dissolved	Magnesium - Total
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
0.001	0.1	0.1	0.1	0.1	0.1	0.1
ARL No. 29/402/403	ARL No. 029	ARL No. 029	ARL No. 029	ARL No. 029	ARL No. 029	ARL No. 029
<0.001	530	580	510	550	1,300	1,400
<0.001	530	560	480	560	1,300	1,400
<0.001	510	560	490	560	1,300	1,400
<0.001	510	560	470	570	1,300	1,400
<0.001	510	520	470	540	1,300	1,400
<0.001	510	520	460	530	1,300	1,400
<0.001	510	530	460	540	1,300	1,400
<0.001	500	510	480	520	1,300	1,400
<0.001	560	560	540	570	1,400	1,400
<0.001	520	520	500	550	1,400	1,400
<0.001	530	560	490	590	1,400	1,400
<0.001	500	520	470	590	1,300	1,400
<0.001	500	500	480	560	1,300	1,400
<0.001	540	540	470	580	1,300	1,400
<0.001	500	510	470	520	1,300	1,400
<0.001	510	510	470	520	1,300	1,400
<0.001	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
<0.001	500	520	490	540	1,400	1,400

Sodium - Dissolved	Sodium - Total	Total Nitrogen	Total Kjeldahl Nitrogen	Total Phosphorus	Bromide	Chloride	Sulfate
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
0.1	0.1	0.2	0.2	0.01	0.1	5	1
ARL No. 029	ARL No. 029	ARL No. 330	ARL No. 330	ARL No. 308	ARL No. 323	ARL No. 305	ARL No. 301
11,000	11,000	1	1	0.03	73	21,000	2,900
11,000	11,000	0.5	0.5	0.02	80	21,000	2,800
11,000	11,000	0.4	0.4	0.02	83	21,000	2,800
11,000	11,000	0.5	0.5	0.03	84	21,000	2,900
11,000	11,000	0.5	0.5	0.02	82	21,000	2,800
10,000	11,000	0.5	0.5	0.02	74	22,000	2,900
11,000	11,000	0.4	0.4	0.02	77	22,000	2,900
11,000	11,000	0.5	0.5	0.02	81	22,000	2,900
11,000	11,000	0.6	0.6	0.03	86	22,000	2,900
11,000	11,000	0.5	0.5	0.02	84	22,000	3,000
11,000	11,000	0.4	0.4	0.02	77	22,000	2,900
11,000	11,000	0.6	0.6	0.02	87	22,000	2,800
11,000	11,000	0.5	0.5	0.02	72	21,000	2,800
11,000	11,000	0.5	0.5	0.01	75	22,000	2,800
11,000	11,000	0.5	0.5	0.1	72	22,000	2,800
11,000	11,000	0.6	0.6	0.02	88	22,000	2,800
<0.1	0.7	0.8	0.8	<0.01	<0.1	<5	<1
11,000	11,000	0.9	0.9	0.01	79	24,000	2,900

Filterable Reactive Phosphorus	Ammonia-N	Nitrate-N	NOx-N	Nitrite-N	pH	Conductivity	Total Dissolved Solids	Total Suspended Solids
mg/L	mg/L	mg/L	mg/L	mg/L	pH units	mS/cm	mg/L	mg/L
0.01	0.02	0.01	0.01	0.01	0.1	0.01	5	5
ARL No. 309	ARL No. 303	ARL No. 313/319	ARL No. 313/319	ARL No. 311	ARL No. 014	ARL No. 019	ARL No. 017	ARL No. 016
<0.01	<0.02	<0.01	<0.01	<0.01	8.1	53	39,000	9
<0.01	<0.02	<0.01	<0.01	<0.01	8.1	52	40,000	<5
<0.01	<0.02	<0.01	<0.01	<0.01	8.1	52	38,000	6
<0.01	<0.02	<0.01	<0.01	<0.01	8.1	52	37,000	9
<0.01	<0.02	<0.01	<0.01	<0.01	8.1	52	37,000	7
<0.01	<0.02	<0.01	<0.01	<0.01	8.1	52	38,000	<5
<0.01	<0.02	<0.01	<0.01	<0.01	8.1	52	39,000	10
<0.01	<0.02	<0.01	<0.01	<0.01	8.1	53	39,000	10
<0.01	<0.02	<0.01	<0.01	<0.01	8	56	39,000	10
<0.01	<0.02	<0.01	<0.01	<0.01	8.1	54	38,000	7
<0.01	<0.02	<0.01	<0.01	<0.01	8.1	54	38,000	6
<0.01	<0.02	<0.01	<0.01	<0.01	8.1	52	39,000	5
<0.01	<0.02	<0.01	<0.01	<0.01	8.1	52	39,000	5
<0.01	<0.02	<0.01	<0.01	<0.01	8.1	52	39,000	<5
<0.01	<0.02	<0.01	<0.01	<0.01	8.1	52	39,000	<5
<0.01	<0.02	<0.01	<0.01	<0.01	8.1	53	38,000	5
<0.01	<0.02	<0.01	<0.01	<0.01	7.1	<0.01	<5	<5
<0.01	<0.02	<0.01	<0.01	<0.01	8.1	52	39,000	8

Turbidity	Chlorophyll-a	Biochemical Oxygen Demand	Total Organic Carbon	Dissolved Organic Carbon
NTU	Total µg	mg/L	mg/L	mg/L
0.1	1	5	1	1
ARL No. 045	ARL No. 141	ARL No. 011	Subcontracting	Subcontracting
8.9	<0.001	<5	1	1
1	<0.001	<5	1	<1
0.9	<0.001	<5	1	<1
8.3	<0.001	<5	1	<1
5.1	<0.001	<5	<1	<1
3.6	<0.001	<5	<1	<1
5	<0.001	<5	<1	<1
9	<0.001	<5	<1	<1
6.7	<0.001	<5	1	1
3.8	<0.001	<5	1	<1
2.7	<0.001	<5	<1	<1
1.6	<0.001	<5	<1	<1
2.1	<0.001	<5	<1	<1
1.2	<0.001	<5	<1	<1
1.4	<0.001	<5	<1	<1
3	<0.001	<5	<1	<1
<0.1	<0.001	<5	<1	<1
8	<0.001	<5	<1	<1

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ADDRESS: K+S Salt

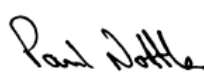
ATTENTION: Paula Cartwright


DATE RECEIVED: 7/08/2019

YOUR REFERENCE: University of WA; K+S Project

PURCHASE ORDER: K+S

APPROVALS:


 Paul Nottle
 Organics Manager


 Douglas Todd
 Laboratory Manager

REPORT COMMENTS:

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Samples are analysed on an as received basis unless otherwise noted.

METHOD REFERENCES:

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377
 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561
 Methods prefixed with "EDP" are covered under NATA Accreditation Number: 19290

Method ID	Method Description
ARL No. 007	Benzene, Toluene, Ethylbenzene and Xylenes in Water
ARL No. 005	Polycyclic Aromatic Hydrocarbons in Water
ARL No. 100	Organotins in Water
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 040	Arsenic by Hydride Atomic Absorption
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids
ARL No. 016	Total Suspended Solids
ARL No. 045	Turbidity
ARL No. 141	Chlorophyll-a and Pheophytin-a in Water
ARL No. 011	Biochemical Oxygen Demand
Subcontracting	See Report Comments section for more information.



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BTEX in Water			Sample No	19-12809-1	19-12809-2	19-12809-3	19-12809-4	19-12809-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Locker Point Top
Sample Date			17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-12809-6	19-12809-7	19-12809-8	19-12809-9	19-12809-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Off
Sample Date			17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-12809-11	19-12809-12	19-12809-13	19-12809-14	19-12809-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Eva Island Bottom
Sample Date			16/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-12809-16	19-12809-17	19-12809-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	Tent Island Bottom
Sample Date			16/07/2019	16/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003

PAH in Water			Sample No	19-12809-1	19-12809-2	19-12809-3	19-12809-4	19-12809-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Locker Point Top
Sample Date			17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	19-12809-1	19-12809-2	19-12809-3	19-12809-4	19-12809-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-12809-6	19-12809-7	19-12809-8	19-12809-9	19-12809-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-12809-11	19-12809-12	19-12809-13	19-12809-14	19-12809-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				16/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	19-12809-11	19-12809-12	19-12809-13	19-12809-14	19-12809-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				16/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-12809-16	19-12809-17	19-12809-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				16/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	

Organotins in Water			Sample No	19-12809-1	19-12809-2	19-12809-3	19-12809-4	19-12809-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	

Organotins in Water			Sample No	19-12809-6	19-12809-7	19-12809-8	19-12809-9	19-12809-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	

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Organotins in Water			Sample No	19-12809-11	19-12809-12	19-12809-13	19-12809-14	19-12809-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			16/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	

Organotins in Water			Sample No	19-12809-16	19-12809-17	19-12809-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			16/07/2019	16/07/2019	16/07/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	
Dibutyl tin	5	ngSn/L	<5	<5	<5	
Tributyl tin	2	ngSn/L	<2	<2	<2	

Metals in Water			Sample No	19-12809-1	19-12809-2	19-12809-3	19-12809-4	19-12809-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Aluminium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Zinc - Total	0.005	mg/L	<0.005	0.005	<0.005	<0.005	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Calcium - Dissolved	0.1	mg/L	500	490	490	490	490	

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Metals in Water			Sample No	19-12809-1	19-12809-2	19-12809-3	19-12809-4	19-12809-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
Calcium - Total	0.1	mg/L		520	510	500	500	500
Potassium - Dissolved	0.1	mg/L		470	470	480	480	480
Potassium - Total	0.1	mg/L		570	570	540	540	550
Magnesium - Dissolved	0.1	mg/L		1,300	1,300	1,400	1,300	1,400
Magnesium - Total	0.1	mg/L		1,400	1,400	1,500	1,400	1,400
Sodium - Dissolved	0.1	mg/L		11,000	11,000	11,000	11,000	11,000
Sodium - Total	0.1	mg/L		11,000	11,000	11,000	11,000	11,000

Metals in Water			Sample No	19-12809-6	19-12809-7	19-12809-8	19-12809-9	19-12809-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	<0.01	<0.01	<0.01	0.06	<0.01	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Zinc - Total	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.001	0.002	0.002	0.001	0.002	
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	0.001	<0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	0.002	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Calcium - Dissolved	0.1	mg/L	500	480	480	480	470	
Calcium - Total	0.1	mg/L	500	510	520	500	510	
Potassium - Dissolved	0.1	mg/L	490	490	470	470	480	
Potassium - Total	0.1	mg/L	560	540	590	560	550	
Magnesium - Dissolved	0.1	mg/L	1,400	1,400	1,300	1,300	1,400	
Magnesium - Total	0.1	mg/L	1,500	1,400	1,500	1,400	1,400	

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Metals in Water			Sample No	19-12809-6	19-12809-7	19-12809-8	19-12809-9	19-12809-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
Sodium - Dissolved	0.1	mg/L		11,000	11,000	11,000	11,000	11,000
Sodium - Total	0.1	mg/L		11,000	11,000	11,000	11,000	11,000

Metals in Water			Sample No	19-12809-11	19-12809-12	19-12809-13	19-12809-14	19-12809-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				16/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L	<0.005	<0.005	0.005	<0.005	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	470	480	480	480	490	490
Calcium - Total	0.1	mg/L	520	520	530	520	500	500
Potassium - Dissolved	0.1	mg/L	470	490	490	490	480	480
Potassium - Total	0.1	mg/L	510	530	520	530	560	560
Magnesium - Dissolved	0.1	mg/L	1,400	1,300	1,400	1,400	1,300	1,300
Magnesium - Total	0.1	mg/L	1,400	1,400	1,500	1,400	1,500	1,500
Sodium - Dissolved	0.1	mg/L	11,000	11,000	11,000	11,000	11,000	11,000
Sodium - Total	0.1	mg/L	11,000	11,000	11,000	11,000	11,000	11,000

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Metals in Water			Sample No	19-12809-16	19-12809-17	19-12809-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			16/07/2019	16/07/2019	16/07/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Aluminium - Total	0.01	mg/L	<0.01	<0.01	0.02	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	0.006	
Zinc - Total	0.005	mg/L	<0.005	<0.005	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.002	<0.001	0.002	
Arsenic - Total	0.001	mg/L	0.002	<0.001	0.002	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	0.002	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	0.001	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	0.002	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Calcium - Dissolved	0.1	mg/L	490	<0.1	490	
Calcium - Total	0.1	mg/L	490	<0.1	500	
Potassium - Dissolved	0.1	mg/L	470	<0.1	470	
Potassium - Total	0.1	mg/L	520	<0.1	520	
Magnesium - Dissolved	0.1	mg/L	1,300	<0.1	1,300	
Magnesium - Total	0.1	mg/L	1,400	<0.1	1,400	
Sodium - Dissolved	0.1	mg/L	11,000	<0.1	11,000	
Sodium - Total	0.1	mg/L	11,000	<0.1	11,000	

Total Nitrogen in Water			Sample No	19-12809-1	19-12809-2	19-12809-3	19-12809-4	19-12809-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Total Nitrogen	0.2	mg/L	1.0	0.7	0.8	0.8	0.8	
Total Kjeldahl Nitrogen	0.2	mg/L	1.0	0.7	0.8	0.8	0.8	

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Total Nitrogen in Water			Sample No	19-12809-6	19-12809-7	19-12809-8	19-12809-9	19-12809-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.7	0.8	0.8	0.8	0.8	5.0
Total Kjeldahl Nitrogen	0.2	mg/L	0.7	0.8	0.8	0.8	0.8	5.0

Total Nitrogen in Water			Sample No	19-12809-11	19-12809-12	19-12809-13	19-12809-14	19-12809-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			16/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.9	0.8	0.8	6.0	0.8	
Total Kjeldahl Nitrogen	0.2	mg/L	0.9	0.8	0.8	6.0	0.8	

Total Nitrogen in Water			Sample No	19-12809-16	19-12809-17	19-12809-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			16/07/2019	16/07/2019	16/07/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.7	0.6	5.9	
Total Kjeldahl Nitrogen	0.2	mg/L	0.7	0.6	5.9	

Total Phosphorus in Water			Sample No	19-12809-1	19-12809-2	19-12809-3	19-12809-4	19-12809-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.03	0.01	0.02	0.01	0.02	

Total Phosphorus in Water			Sample No	19-12809-6	19-12809-7	19-12809-8	19-12809-9	19-12809-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.02	0.03	0.02	0.01	0.01	

Total Phosphorus in Water			Sample No	19-12809-11	19-12809-12	19-12809-13	19-12809-14	19-12809-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			16/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.03	<0.01	0.02	0.01	0.01	

Total Phosphorus in Water			Sample No	19-12809-16	19-12809-17	19-12809-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			16/07/2019	16/07/2019	16/07/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.02	<0.01	0.03	

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Ions by Discrete Analyser			Sample No	19-12809-1	19-12809-2	19-12809-3	19-12809-4	19-12809-5
			Sample Description	Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
			Sample Date	17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	62	63	62	65	61	
Chloride	5	mg/L	21,000	21,000	21,000	21,000	21,000	21,000
Sulfate	1	mg/L	2,900	3,000	3,000	3,000	3,000	3,000
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No	19-12809-6	19-12809-7	19-12809-8	19-12809-9	19-12809-10
			Sample Description	Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
			Sample Date	17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	67	60	60	69	69	69
Chloride	5	mg/L	22,000	22,000	22,000	22,000	22,000	22,000
Sulfate	1	mg/L	3,000	3,000	2,900	3,000	3,000	3,000
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No	19-12809-11	19-12809-12	19-12809-13	19-12809-14	19-12809-15
			Sample Description	Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
			Sample Date	16/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	69	65	64	60	63	
Chloride	5	mg/L	22,000	22,000	22,000	22,000	21,000	
Sulfate	1	mg/L	3,000	3,000	3,000	3,000	2,900	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	0.02	<0.02	<0.02	0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No	19-12809-16	19-12809-17	19-12809-18
			Sample Description	Tent Island Top	Locker SW	Tent Island Bottom
			Sample Date	16/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Bromide	0.1	mg/L	63	<0.1	64	
Chloride	5	mg/L	22,000	<5	22,000	
Sulfate	1	mg/L	3,000	<1	3,000	

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Ions by Discrete Analyser			Sample No	19-12809-16	19-12809-17	19-12809-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				16/07/2019	16/07/2019	16/07/2019
Filterable Reactive Phosphorus	0.01	mg/L		<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L		0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L		<0.01	<0.01	<0.01
NOx-N	0.01	mg/L		<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L		<0.01	<0.01	<0.01

Physical Parameters			Sample No	19-12809-1	19-12809-2	19-12809-3	19-12809-4	19-12809-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.1	8.1	8.1	8.1	8.1	8.1
Conductivity	0.01	mS/cm	54	53	53	53	53	53
Total Dissolved Solids	5	mg/L	38,000	39,000	40,000	38,000	39,000	39,000
Total Suspended Solids	5	mg/L	8	<5	6	6	5	5
Turbidity	0.1	NTU	6.7	0.3	0.3	1.0	1.4	1.4
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	<1

Physical Parameters			Sample No	19-12809-6	19-12809-7	19-12809-8	19-12809-9	19-12809-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.1	8.1	8.2	8.1	8.2	8.2
Conductivity	0.01	mS/cm	54	53	54	55	53	53
Total Dissolved Solids	5	mg/L	40,000	40,000	39,000	39,000	39,000	39,000
Total Suspended Solids	5	mg/L	6	14	12	8	7	7
Turbidity	0.1	NTU	2.8	2.7	7.4	3.8	1.7	1.7
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	<1

Physical Parameters			Sample No	19-12809-11	19-12809-12	19-12809-13	19-12809-14	19-12809-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				16/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.2	8.2	8.2	8.2	8.2	8.2
Conductivity	0.01	mS/cm	54	53	53	53	53	53
Total Dissolved Solids	5	mg/L	38,000	39,000	40,000	39,000	39,000	37,000
Total Suspended Solids	5	mg/L	7	6	6	11	13	13
Turbidity	0.1	NTU	3.9	0.4	0.9	0.5	1.5	1.5
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	<1

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Physical Parameters			Sample No	19-12809-16	19-12809-17	19-12809-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				16/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
pH	0.1	pH units	8.2	6.7	8.2	
Conductivity	0.01	mS/cm	53	<0.01	54	
Total Dissolved Solids	5	mg/L	39,000	<5	38,000	
Total Suspended Solids	5	mg/L	12	<5	14	
Turbidity	0.1	NTU	7.6	0.1	3.8	
Chlorophyll-a	1	Total µg	<1	<1	<1	

Biochemical Oxygen Demand			Sample No	19-12809-1	19-12809-2	19-12809-3	19-12809-4	19-12809-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	19-12809-6	19-12809-7	19-12809-8	19-12809-9	19-12809-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	19-12809-11	19-12809-12	19-12809-13	19-12809-14	19-12809-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				16/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	19-12809-16	19-12809-17	19-12809-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				16/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5

Subcontracting			Sample No	19-12809-1	19-12809-2	19-12809-3	19-12809-4	19-12809-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	1	1	1	1	1
Dissolved Organic Carbon	1	mg/L	<1	1	1	1	1	1

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Subcontracting			Sample No	19-12809-6	19-12809-7	19-12809-8	19-12809-9	19-12809-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			17/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Total Organic Carbon	1	mg/L	1	1	1	1	2	
Dissolved Organic Carbon	1	mg/L	1	1	1	1	1	

Subcontracting			Sample No	19-12809-11	19-12809-12	19-12809-13	19-12809-14	19-12809-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			16/07/2019	17/07/2019	17/07/2019	16/07/2019	16/07/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Total Organic Carbon	1	mg/L	2	2	1	2	1	
Dissolved Organic Carbon	1	mg/L	1	2	1	1	1	

Subcontracting			Sample No	19-12809-16	19-12809-17	19-12809-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			16/07/2019	16/07/2019	16/07/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Total Organic Carbon	1	mg/L	1	<1	2	
Dissolved Organic Carbon	1	mg/L	<1	<1	1	

Result Definitions

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting
* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

LABORATORY REPORT

Job Number: 19-14930
Revision: 00
Date: 24 September 2019

ADDRESS: K+S Salt

ATTENTION: Paula Cartwright

DATE RECEIVED: 9/09/2019

YOUR REFERENCE: University of WA; K+S Project

PURCHASE ORDER: K+S

APPROVALS:

			
Paul Nottle Organics Manager	Douglas Todd Laboratory Manager	Sean Sangster Inorganics Supervisor	Sam Becker Inorganics Manager

REPORT COMMENTS:

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Samples are analysed on an as received basis unless otherwise noted.

Total and Dissolved Organic Carbon analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 232613

METHOD REFERENCES:

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377
 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561
 Methods prefixed with "EDP" are covered under NATA Accreditation Number: 19290

Method ID	Method Description
ARL No. 007	Benzene, Toluene, Ethylbenzene and Xylenes in Water
ARL No. 005	Polycyclic Aromatic Hydrocarbons in Water
ARL No. 100	Organotins in Water
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 040	Arsenic by Hydride Atomic Absorption
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids
ARL No. 016	Total Suspended Solids
ARL No. 045	Turbidity
ARL No. 141	Chlorophyll-a and Pheophytin-a in Water
ARL No. 011	Biochemical Oxygen Demand
Subcontracting	See Report Comments section for more information.



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BTEX in Water			Sample No	19-14930-1	19-14930-2	19-14930-3	19-14930-4	19-14930-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Locker Point Top
Sample Date			8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-14930-6	19-14930-7	19-14930-8	19-14930-9	19-14930-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Channel	Urala Creek South Off
Sample Date			8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-14930-11	19-14930-12	19-14930-13	19-14930-14	19-14930-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Top	Eva Island Bottom
Sample Date			8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-14930-16	19-14930-17	19-14930-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	Tent Island Bottom
Sample Date			8/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003

PAH in Water			Sample No	19-14930-1	19-14930-2	19-14930-3	19-14930-4	19-14930-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Bottom	Locker Point Top
Sample Date			8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	19-14930-1	19-14930-2	19-14930-3	19-14930-4	19-14930-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-14930-6	19-14930-7	19-14930-8	19-14930-9	19-14930-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-14930-11	19-14930-12	19-14930-13	19-14930-14	19-14930-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	19-14930-11	19-14930-12	19-14930-13	19-14930-14	19-14930-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-14930-16	19-14930-17	19-14930-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	

Organotins in Water			Sample No	19-14930-1	19-14930-2	19-14930-3	19-14930-4	19-14930-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	

Organotins in Water			Sample No	19-14930-6	19-14930-7	19-14930-8	19-14930-9	19-14930-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	

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Organotins in Water			Sample No	19-14930-11	19-14930-12	19-14930-13	19-14930-14	19-14930-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

Organotins in Water			Sample No	19-14930-16	19-14930-18
Sample Description				Tent Island Top	Tent Island Bottom
Sample Date				8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2

Metals in Water			Sample No	19-14930-1	19-14930-2	19-14930-3	19-14930-4	19-14930-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	0.001	0.001	0.001	0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	480	460	440	480	470	470

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Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019	
Calcium - Total	0.1	mg/L	480	460	460	480	470	
Potassium - Dissolved	0.1	mg/L	440	430	410	430	420	
Potassium - Total	0.1	mg/L	440	430	430	430	420	
Magnesium - Dissolved	0.1	mg/L	1,400	1,300	1,300	1,400	1,300	
Magnesium - Total	0.1	mg/L	1,400	1,400	1,400	1,400	1,500	
Sodium - Dissolved	0.1	mg/L	10,000	10,000	10,000	11,000	11,000	
Sodium - Total	0.1	mg/L	11,000	11,000	11,000	11,000	11,000	

Metals in Water			Sample No	19-14930-6	19-14930-7	19-14930-8	19-14930-9	19-14930-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.001	0.002	0.002
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.001	0.002	0.002
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	0.002	0.002	0.002	0.002
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	0.008	0.009	0.002	0.002
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	510	450	450	520	450	
Calcium - Total	0.1	mg/L	510	450	460	520	450	
Potassium - Dissolved	0.1	mg/L	450	410	410	470	410	
Potassium - Total	0.1	mg/L	450	410	420	480	420	
Magnesium - Dissolved	0.1	mg/L	1,400	1,300	1,300	1,400	1,300	
Magnesium - Total	0.1	mg/L	1,400	1,500	1,500	1,500	1,500	

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Metals in Water			Sample No	19-14930-6	19-14930-7	19-14930-8	19-14930-9	19-14930-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019
Sodium - Dissolved	0.1	mg/L		11,000	10,000	10,000	11,000	10,000
Sodium - Total	0.1	mg/L		11,000	11,000	11,000	11,000	11,000

Metals in Water			Sample No	19-14930-11	19-14930-12	19-14930-13	19-14930-14	19-14930-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	460	440	480	480	470	
Calcium - Total	0.1	mg/L	460	450	480	480	480	
Potassium - Dissolved	0.1	mg/L	430	410	440	410	410	
Potassium - Total	0.1	mg/L	430	410	420	420	410	
Magnesium - Dissolved	0.1	mg/L	1,400	1,300	1,300	1,300	1,300	
Magnesium - Total	0.1	mg/L	1,400	1,500	1,500	1,500	1,500	
Sodium - Dissolved	0.1	mg/L	11,000	10,000	10,000	10,000	10,000	
Sodium - Total	0.1	mg/L	11,000	11,000	11,000	11,000	11,000	

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Metals in Water			Sample No	19-14930-16	19-14930-17	19-14930-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			8/09/2019	8/09/2019	8/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Aluminium - Total	0.01	mg/L	0.03	<0.01	<0.01	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	<0.005	0.038	<0.005	
Zinc - Total	0.005	mg/L	<0.005	0.046	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.002	<0.001	0.002	
Arsenic - Total	0.001	mg/L	0.002	<0.001	0.002	
Chromium - Dissolved	0.001	mg/L	<0.001	0.001	<0.001	
Chromium - Total	0.001	mg/L	0.001	0.002	0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	<0.001	0.090	<0.001	
Copper - Total	0.001	mg/L	<0.001	0.090	<0.001	
Lead - Dissolved	0.001	mg/L	<0.001	0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	0.002	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	0.003	0.005	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Calcium - Dissolved	0.1	mg/L	470	86	470	
Calcium - Total	0.1	mg/L	470	86	470	
Potassium - Dissolved	0.1	mg/L	420	4.0	420	
Potassium - Total	0.1	mg/L	420	4.0	420	
Magnesium - Dissolved	0.1	mg/L	1,400	35	1,300	
Magnesium - Total	0.1	mg/L	1,400	35	1,500	
Sodium - Dissolved	0.1	mg/L	10,000	100	10,000	
Sodium - Total	0.1	mg/L	11,000	110	11,000	

Total Nitrogen in Water			Sample No	19-14930-1	19-14930-2	19-14930-3	19-14930-4	19-14930-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Total Nitrogen	0.2	mg/L	0.4	0.5	0.4	0.8	0.3	
Total Kjeldahl Nitrogen	0.2	mg/L	0.4	0.5	0.4	0.8	0.3	

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Total Nitrogen in Water			Sample No	19-14930-6	19-14930-7	19-14930-8	19-14930-9	19-14930-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.3	0.4	0.3	0.4	0.3	0.3
Total Kjeldahl Nitrogen	0.2	mg/L	0.3	0.4	0.3	0.4	0.3	0.3

Total Nitrogen in Water			Sample No	19-14930-11	19-14930-12	19-14930-13	19-14930-14	19-14930-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.7	0.3	0.3	0.4	0.3	0.3
Total Kjeldahl Nitrogen	0.2	mg/L	0.7	0.3	0.3	0.4	0.3	0.3

Total Nitrogen in Water			Sample No	19-14930-16	19-14930-17	19-14930-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			8/09/2019	8/09/2019	8/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.3	0.4	0.9	
Total Kjeldahl Nitrogen	0.2	mg/L	0.3	0.4	1.3	

Total Phosphorus in Water			Sample No	19-14930-1	19-14930-2	19-14930-3	19-14930-4	19-14930-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	<0.01	0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No	19-14930-6	19-14930-7	19-14930-8	19-14930-9	19-14930-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No	19-14930-11	19-14930-12	19-14930-13	19-14930-14	19-14930-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No	19-14930-16	19-14930-17	19-14930-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			8/09/2019	8/09/2019	8/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	0.13	0.01	

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Ions by Discrete Analyser			Sample No	19-14930-1	19-14930-2	19-14930-3	19-14930-4	19-14930-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Island Bottom	Locker Point Bottom	Locker Point Top
Sample Date			8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	60	62	65	60	64	64
Chloride	5	mg/L	20,000	20,000	20,000	20,000	20,000	21,000
Sulfate	1	mg/L	2,900	2,900	2,900	3,000	3,000	3,000
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No	19-14930-6	19-14930-7	19-14930-8	19-14930-9	19-14930-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Off
Sample Date			8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	64	64	68	62	65	65
Chloride	5	mg/L	21,000	20,000	20,000	20,000	21,000	21,000
Sulfate	1	mg/L	3,100	2,900	2,900	3,200	2,900	2,900
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.03	0.03
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.03	0.03
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No	19-14930-11	19-14930-12	19-14930-13	19-14930-14	19-14930-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Eva Island Bottom
Sample Date			8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	61	69	60	61	68	68
Chloride	5	mg/L	20,000	20,000	20,000	20,000	20,000	20,000
Sulfate	1	mg/L	2,900	2,900	2,900	2,900	2,900	2,900
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No	19-14930-16	19-14930-17	19-14930-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	Tent Island Bottom
Sample Date			8/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Bromide	0.1	mg/L	61	1.6	60	60
Chloride	5	mg/L	20,000	300	21,000	21,000
Sulfate	1	mg/L	2,900	32	2,900	2,900

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Ions by Discrete Analyser			Sample No	19-14930-16	19-14930-17	19-14930-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			8/09/2019	8/09/2019	8/09/2019	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	0.02	<0.01	
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	2.0	<0.01	
NOx-N	0.01	mg/L	<0.01	2.0	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	

Physical Parameters			Sample No	19-14930-1	19-14930-2	19-14930-3	19-14930-4	19-14930-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.2	8.2	8.2	8.2	8.2	8.2
Conductivity	0.01	mS/cm	55	53	51	55	55	55
Total Dissolved Solids	5	mg/L	39,000	39,000	39,000	40,000	38,000	38,000
Total Suspended Solids	5	mg/L	<5	<5	<5	5	<5	<5
Turbidity	0.1	NTU	1.1	0.7	0.3	0.7	1.3	1.3
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	<1

Physical Parameters			Sample No	19-14930-6	19-14930-7	19-14930-8	19-14930-9	19-14930-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.2	8.3	8.2	8.2	8.2	8.2
Conductivity	0.01	mS/cm	59	53	54	60	54	54
Total Dissolved Solids	5	mg/L	39,000	38,000	39,000	39,000	38,000	38,000
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5	<5
Turbidity	0.1	NTU	1.1	0.5	0.4	1.1	1.0	1.0
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	<1

Physical Parameters			Sample No	19-14930-11	19-14930-12	19-14930-13	19-14930-14	19-14930-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.2	8.2	8.3	8.3	8.2	8.2
Conductivity	0.01	mS/cm	56	53	53	54	54	54
Total Dissolved Solids	5	mg/L	39,000	38,000	40,000	40,000	39,000	39,000
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5	<5
Turbidity	0.1	NTU	0.7	0.4	0.3	<0.1	0.2	0.2
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	<1

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Physical Parameters			Sample No	19-14930-16	19-14930-17	19-14930-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
pH	0.1	pH units	8.2	7.6	8.2	
Conductivity	0.01	mS/cm	54	1.3	53	
Total Dissolved Solids	5	mg/L	40,000	620	39,000	
Total Suspended Solids	5	mg/L	<5	<5	<5	
Turbidity	0.1	NTU	1.3	<0.1	0.5	
Chlorophyll-a	1	Total µg	<1	<1	<1	

Biochemical Oxygen Demand			Sample No	19-14930-1	19-14930-2	19-14930-3	19-14930-4	19-14930-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	

Biochemical Oxygen Demand			Sample No	19-14930-6	19-14930-7	19-14930-8	19-14930-9	19-14930-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	

Biochemical Oxygen Demand			Sample No	19-14930-11	19-14930-12	19-14930-13	19-14930-14	19-14930-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	

Biochemical Oxygen Demand			Sample No	19-14930-16	19-14930-17	19-14930-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	

Subcontracting			Sample No	19-14930-1	19-14930-2	19-14930-3	19-14930-4	19-14930-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Total Organic Carbon	1	mg/L	<1	<1	<1	1	1	
Dissolved Organic Carbon	1	mg/L	<1	<1	<1	1	1	

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Subcontracting			Sample No	19-14930-6	19-14930-7	19-14930-8	19-14930-9	19-14930-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	<1	<1	<1	1	<1
Dissolved Organic Carbon	1	mg/L	1	<1	<1	<1	1	<1

Subcontracting			Sample No	19-14930-11	19-14930-12	19-14930-13	19-14930-14	19-14930-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	<1	<1	<1	<1	<1
Dissolved Organic Carbon	1	mg/L	<1	<1	<1	<1	<1	<1

Subcontracting			Sample No	19-14930-16	19-14930-17	19-14930-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			8/09/2019	8/09/2019	8/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	<1	<1	<1
Dissolved Organic Carbon	1	mg/L	<1	<1	<1	<1

Result Definitions

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting
* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

LABORATORY REPORT

Job Number: 19-16806
Revision: 00
Date: 7 November 2019

ADDRESS: K+S Salt




ATTENTION: Paula Cartwright

DATE RECEIVED: 8/10/2019

YOUR REFERENCE: University of WA; K+S Project

PURCHASE ORDER: K+S

APPROVALS:




 Paul Nottle Kim Rodgers Sean Sangster
 Organics Manager General Manager Inorganics Supervisor

REPORT COMMENTS:

This report is issued by Analytical Reference Laboratory (WA) Pty Ltd. The report shall not be reproduced except in full without written approval from the laboratory.

Samples are analysed on an as received basis unless otherwise noted.

Total and Dissolved Organic Carbon analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 234114

METHOD REFERENCES:

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377
 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561
 Methods prefixed with "EDP" are covered under NATA Accreditation Number: 19290

Method ID	Method Description
ARL No. 007	Benzene, Toluene, Ethylbenzene and Xylenes in Water
ARL No. 005	Polycyclic Aromatic Hydrocarbons in Water
ARL No. 100	Organotins in Water
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 040	Arsenic by Hydride Atomic Absorption
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids
ARL No. 016	Total Suspended Solids
ARL No. 045	Turbidity
ARL No. 141	Chlorophyll-a and Pheophytin-a in Water
ARL No. 011	Biochemical Oxygen Demand
Subcontracting	See Report Comments section for more information.



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BTEX in Water			Sample No	19-16806-1	19-16806-2	19-16806-3	19-16806-4	19-16806-5
Sample Description			Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Urala Creek North Channel	
Sample Date			6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-16806-6	19-16806-7	19-16806-8	19-16806-9	19-16806-10
Sample Description			Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near	
Sample Date			6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-16806-11	19-16806-12	19-16806-13	19-16806-14	19-16806-15
Sample Description			Fly Island Top	Fly Island Bottom	Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

PAH in Water			Sample No	19-16806-1	19-16806-2	19-16806-3	19-16806-4	19-16806-5
Sample Description			Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Urala Creek North Channel	
Sample Date			6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	19-16806-6	19-16806-7	19-16806-8	19-16806-9	19-16806-10
Sample Description			Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near	
Sample Date			6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-16806-11	19-16806-12	19-16806-13	19-16806-14
Sample Description			Fly Island Top	Fly Island Bottom	Tent Island Top	Locker SW	
Sample Date			6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1

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Organotins in Water			Sample No	19-16806-1	19-16806-2	19-16806-3	19-16806-4	19-16806-5
Sample Description				Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Urala Creek North Channel
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

Organotins in Water			Sample No	19-16806-6	19-16806-7	19-16806-8	19-16806-9	19-16806-10
Sample Description				Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

Organotins in Water			Sample No	19-16806-11	19-16806-12	19-16806-13	19-16806-14
Sample Description				Fly Island Top	Fly Island Bottom	Tent Island Top	Locker SW
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2

Metals in Water			Sample No	19-16806-1	19-16806-2	19-16806-3	19-16806-4	19-16806-5
Sample Description				Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Urala Creek North Channel
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.03
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.003	0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

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Metals in Water			Sample No	19-16806-1	19-16806-2	19-16806-3	19-16806-4	19-16806-5
Sample Description				Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Urala Creek North Channel
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
Nickel - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L		530	490	480	430	440
Calcium - Total	0.1	mg/L		530	490	480	430	440
Potassium - Dissolved	0.1	mg/L		440	420	450	450	500
Potassium - Total	0.1	mg/L		460	440	460	450	500
Magnesium - Dissolved	0.1	mg/L		1,300	1,300	1,400	1,400	1,600
Magnesium - Total	0.1	mg/L		1,500	1,400	1,600	1,400	1,700
Sodium - Dissolved	0.1	mg/L		9,900	11,000	11,000	11,000	12,000
Sodium - Total	0.1	mg/L		11,000	11,000	11,000	11,000	13,000

Metals in Water			Sample No	19-16806-6	19-16806-7	19-16806-8	19-16806-9	19-16806-10
Sample Description				Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	<0.01	<0.01	<0.01	0.02	0.04	0.04
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	0.015	0.012	0.008	<0.005	<0.005
Zinc - Total	0.005	mg/L	<0.005	0.018	0.012	0.018	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.001	0.002	0.002	0.002
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.001	0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

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Metals in Water			Sample No	19-16806-6	19-16806-7	19-16806-8	19-16806-9	19-16806-10
Sample Description			Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near	
Sample Date			6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	440	480	520	440	440	440
Calcium - Total	0.1	mg/L	440	480	520	440	440	440
Potassium - Dissolved	0.1	mg/L	440	480	510	460	500	500
Potassium - Total	0.1	mg/L	460	480	580	480	500	500
Magnesium - Dissolved	0.1	mg/L	1,400	1,500	1,600	1,500	1,700	1,700
Magnesium - Total	0.1	mg/L	1,500	1,600	2,000	1,700	1,700	1,700
Sodium - Dissolved	0.1	mg/L	12,000	13,000	14,000	13,000	12,000	12,000
Sodium - Total	0.1	mg/L	12,000	13,000	15,000	13,000	12,000	12,000

Metals in Water			Sample No	19-16806-11	19-16806-12	19-16806-13	19-16806-14
Sample Description			Fly Island Top	Fly Island Bottom	Tent Island Top	Locker SW	
Sample Date			6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	<0.01	<0.01	0.02	<0.01	<0.01
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	0.009	0.013	<0.005	0.039	0.039
Zinc - Total	0.005	mg/L	0.010	0.014	<0.005	0.046	0.046
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	<0.001	<0.001
Arsenic - Total	0.001	mg/L	0.002	0.002	0.003	<0.001	<0.001
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	0.002	0.002
Copper - Total	0.001	mg/L	<0.001	0.001	0.001	0.003	0.003
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	440	420	430	<0.1	<0.1
Calcium - Total	0.1	mg/L	440	430	430	<0.1	<0.1
Potassium - Dissolved	0.1	mg/L	450	420	450	<0.1	<0.1
Potassium - Total	0.1	mg/L	450	420	450	<0.1	<0.1

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Metals in Water			Sample No	19-16806-11	19-16806-12	19-16806-13	19-16806-14
Sample Description				Fly Island Top	Fly Island Bottom	Tent Island Top	Locker SW
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019
Magnesium - Dissolved	0.1	mg/L		1,500	1,300	1,600	<0.1
Magnesium - Total	0.1	mg/L		1,500	1,300	1,600	<0.1
Sodium - Dissolved	0.1	mg/L		13,000	9,600	11,000	0.4
Sodium - Total	0.1	mg/L		13,000	10,000	11,000	0.4

Total Nitrogen in Water			Sample No	19-16806-1	19-16806-2	19-16806-3	19-16806-4	19-16806-5
Sample Description				Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Urala Creek North Channel
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Total Nitrogen in Water			Sample No	19-16806-6	19-16806-7	19-16806-8	19-16806-9	19-16806-10
Sample Description				Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	0.9	<0.2	<0.2	<0.2	0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	0.9	<0.2	<0.2	<0.2	0.2

Total Nitrogen in Water			Sample No	19-16806-11	19-16806-12	19-16806-13	19-16806-14
Sample Description				Fly Island Top	Fly Island Bottom	Tent Island Top	Locker SW
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	0.2	0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	0.2	0.2

Total Phosphorus in Water			Sample No	19-16806-1	19-16806-2	19-16806-3	19-16806-4	19-16806-5
Sample Description				Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Urala Creek North Channel
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.03	0.02	0.02	0.02	0.02	0.02

Total Phosphorus in Water			Sample No	19-16806-6	19-16806-7	19-16806-8	19-16806-9	19-16806-10
Sample Description				Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.02	0.03	0.03	0.02	0.02	0.02

Total Phosphorus in Water			Sample No	19-16806-11	19-16806-12	19-16806-13	19-16806-14
Sample Description				Fly Island Top	Fly Island Bottom	Tent Island Top	Locker SW
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.02	0.02	0.03	0.02	0.02

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Ions by Discrete Analyser			Sample No	19-16806-1	19-16806-2	19-16806-3	19-16806-4	19-16806-5
Sample Description				Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Urala Creek North Channel
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	72	72	75	75	77	
Chloride	5	mg/L	22,000	22,000	24,000	24,000	26,000	
Sulfate	1	mg/L	3,500	3,500	3,500	3,600	3,700	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Ammonia-N	0.02	mg/L	0.02	<0.02	<0.02	<0.02	0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	

Ions by Discrete Analyser			Sample No	19-16806-6	19-16806-7	19-16806-8	19-16806-9	19-16806-10
Sample Description				Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	74	75	88	75	77	
Chloride	5	mg/L	25,000	25,000	30,000	26,000	26,000	
Sulfate	1	mg/L	3,500	3,500	4,100	3,500	3,500	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Ammonia-N	0.02	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	

Ions by Discrete Analyser			Sample No	19-16806-11	19-16806-12	19-16806-13	19-16806-14
Sample Description				Fly Island Top	Fly Island Bottom	Tent Island Top	Locker SW
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	73	85	84	<0.1	
Chloride	5	mg/L	25,000	20,000	21,000	<5	
Sulfate	1	mg/L	3,300	3,300	3,300	<1	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	

Physical Parameters			Sample No	19-16806-1	19-16806-2	19-16806-3	19-16806-4	19-16806-5
Sample Description				Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Urala Creek North Channel
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	7.1	7.6	7.9	8.1	8.2	
Conductivity	0.01	mS/cm	51	53	54	52	54	
Total Dissolved Solids	5	mg/L	39,000	41,000	42,000	41,000	44,000	
Total Suspended Solids	5	mg/L	6	8	6	8	10	

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Physical Parameters			Sample No	19-16806-1	19-16806-2	19-16806-3	19-16806-4	19-16806-5
Sample Description				Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Urala Creek North Channel
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
Turbidity	0.1	NTU		0.5	0.3	1.0	1.4	1.5
Chlorophyll-a	1	Total µg		<1	<1	<1	<1	<1

Physical Parameters			Sample No	19-16806-6	19-16806-7	19-16806-8	19-16806-9	19-16806-10
Sample Description				Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.3	8.3	8.3	8.4	8.4	8.4
Conductivity	0.01	mS/cm	51	50	59	53	52	52
Total Dissolved Solids	5	mg/L	43,000	42,000	49,000	43,000	44,000	44,000
Total Suspended Solids	5	mg/L	6	9	<5	<5	<5	<5
Turbidity	0.1	NTU	1.2	2.0	0.9	0.7	2.2	2.2
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	<1

Physical Parameters			Sample No	19-16806-11	19-16806-12	19-16806-13	19-16806-14	19-16806-15
Sample Description				Fly Island Top	Fly Island Bottom	Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.4	8.5	8.5	9.2		
Conductivity	0.01	mS/cm	53	53	51	<0.01		
Total Dissolved Solids	5	mg/L	41,000	41,000	40,000	<5		
Total Suspended Solids	5	mg/L	6	6	<5	<5		
Turbidity	0.1	NTU	0.4	0.8	0.8	<0.1		
Chlorophyll-a	1	Total µg	<1	<1		<1		<1

Biochemical Oxygen Demand			Sample No	19-16806-1	19-16806-2	19-16806-3	19-16806-4	19-16806-5
Sample Description				Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Urala Creek North Channel
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	19-16806-6	19-16806-7	19-16806-8	19-16806-9	19-16806-10
Sample Description				Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near
Sample Date				6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

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Biochemical Oxygen Demand		Sample No	19-16806-11	19-16806-12	19-16806-13	19-16806-14
Sample Description			Fly Island Top	Fly Island Bottom	Tent Island Top	Locker SW
Sample Date			6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5

Subcontracting		Sample No	19-16806-1	19-16806-2	19-16806-3	19-16806-4	19-16806-5
Sample Description			Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Urala Creek North Channel
Sample Date			6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	<1	<1	<1	<1
Dissolved Organic Carbon	1	mg/L	<1	<1	<1	<1	<1

Subcontracting		Sample No	19-16806-6	19-16806-7	19-16806-8	19-16806-9	19-16806-10
Sample Description			Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near
Sample Date			6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	<1	2	<1	<1
Dissolved Organic Carbon	1	mg/L	<1	<1	2	<1	<1

Subcontracting		Sample No	19-16806-11	19-16806-12	19-16806-13	19-16806-14	19-16806-15
Sample Description			Fly Island Top	Fly Island Bottom	Tent Island Top	Locker SW	Tent Island Bottom
Sample Date			6/10/2019	6/10/2019	6/10/2019	6/10/2019	6/10/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	<1	<1	<1	<1
Dissolved Organic Carbon	1	mg/L	<1	<1	<1	<1	<1

Result Definitions

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting
* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

LABORATORY REPORT

Job Number: 19-18552
Revision: 00
Date: 11 December 2019

ADDRESS: K+S Salt

ATTENTION: Paula Cartwright

DATE RECEIVED: 4/11/2019

YOUR REFERENCE: University of WA; K+S Project

PURCHASE ORDER: K+S

APPROVALS:




 Paul Nottle Douglas Todd Sean Sangster
 Organics Manager Laboratory Manager Inorganics Supervisor

REPORT COMMENTS:

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Samples are analysed on an as received basis unless otherwise noted.

Total and Dissolved Organic Carbon Analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 235663.

METHOD REFERENCES:

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377
 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561
 Methods prefixed with "EDP" are covered under NATA Accreditation Number: 19290

Method ID	Method Description
ARL No. 007	Benzene, Toluene, Ethylbenzene and Xylenes in Water
ARL No. 005	Polycyclic Aromatic Hydrocarbons in Water
ARL No. 100	Organotins in Water
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 040	Arsenic by Hydride Atomic Absorption
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids
ARL No. 016	Total Suspended Solids
ARL No. 045	Turbidity
ARL No. 141	Chlorophyll-a and Pheophytin-a in Water
ARL No. 011	Biochemical Oxygen Demand
Subcontracting	See Report Comments section for more information.



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Job No: 19-18552

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Revision: 00

Date: 11/12/19

BTEX in Water			Sample No	19-18552-1	19-18552-2	19-18552-3	19-18552-4	19-18552-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-18552-6	19-18552-7	19-18552-8	19-18552-9	19-18552-10
Sample Description				Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near
Sample Date				8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-18552-11	19-18552-12	19-18552-13	19-18552-14	19-18552-15
Sample Description				Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-18552-16	19-18552-17
Sample Description				Locker SW	Tent Island Bottom
Sample Date				8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003

PAH in Water			Sample No	19-18552-1	19-18552-2	19-18552-3	19-18552-4	19-18552-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	19-18552-1	19-18552-2	19-18552-3	19-18552-4	19-18552-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-18552-6	19-18552-7	19-18552-8	19-18552-9	19-18552-10
Sample Description				Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near
Sample Date				8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-18552-11	19-18552-12	19-18552-13	19-18552-14	19-18552-15
Sample Description				Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	19-18552-11	19-18552-12	19-18552-13	19-18552-14	19-18552-15
Sample Description				Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-18552-16	19-18552-17
Sample Description				Locker SW	Tent Island Bottom
Sample Date				8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1

Organotins in Water			Sample No	19-18552-1	19-18552-2	19-18552-3	19-18552-4	19-18552-6
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Urala Creek North Near Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	7/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

Organotins in Water			Sample No	19-18552-7	19-18552-8	19-18552-9	19-18552-10	19-18552-11
Sample Description				Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near	Fly Island Top
Sample Date				8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

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Organotins in Water			Sample No	19-18552-12	19-18552-13	19-18552-14	19-18552-15	19-18552-16
Sample Description			Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top	Locker SW	
Sample Date			7/09/2019	7/09/2019	8/09/2019	8/09/2019	8/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

Organotins in Water			Sample No	19-18552-17
Sample Description			Tent Island Bottom	
Sample Date			8/09/2019	
ANALYTE	LOR	Units	Result	
Monobutyl tin	5	ngSn/L	<5	
Dibutyl tin	5	ngSn/L	<5	
Tributyl tin	2	ngSn/L	<2	

Metals in Water			Sample No	19-18552-1	19-18552-2	19-18552-3	19-18552-4	19-18552-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	0.02	0.01	0.02	<0.01	<0.01	<0.01
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	0.010	0.010	0.007	0.006	0.005	
Zinc - Total	0.005	mg/L	0.010	0.013	0.010	0.018	0.011	
Arsenic - Dissolved	0.001	mg/L	0.001	0.001	0.001	0.002	0.002	
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Calcium - Dissolved	0.1	mg/L	480	450	490	510	470	

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Metals in Water			Sample No	19-18552-1	19-18552-2	19-18552-3	19-18552-4	19-18552-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	Locker Point Top
Sample Date			8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
Calcium - Total	0.1	mg/L	500	460	500	510	480	480
Potassium - Dissolved	0.1	mg/L	430	400	420	440	420	420
Potassium - Total	0.1	mg/L	430	420	420	440	420	420
Magnesium - Dissolved	0.1	mg/L	1,400	1,300	1,400	1,500	1,400	1,400
Magnesium - Total	0.1	mg/L	1,400	1,400	1,400	1,500	1,400	1,400
Sodium - Dissolved	0.1	mg/L	12,000	12,000	11,000	13,000	11,000	11,000
Sodium - Total	0.1	mg/L	11,000	11,000	10,000	11,000	10,000	10,000

Metals in Water			Sample No	19-18552-6	19-18552-7	19-18552-8	19-18552-9	19-18552-10
Sample Description			Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near	Urala Creek South Near
Sample Date			8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	<0.01	0.03	0.05	0.05	0.04	0.04
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.01	0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	0.006	<0.005	0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L	0.016	0.009	0.011	0.012	0.010	0.010
Arsenic - Dissolved	0.001	mg/L	0.001	0.001	0.001	0.001	0.002	0.002
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.001	0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	470	460	500	490	480	480
Calcium - Total	0.1	mg/L	470	470	500	500	490	490
Potassium - Dissolved	0.1	mg/L	440	420	470	450	440	440
Potassium - Total	0.1	mg/L	440	430	470	450	440	440
Magnesium - Dissolved	0.1	mg/L	1,400	1,300	1,500	1,400	1,400	1,400
Magnesium - Total	0.1	mg/L	1,400	1,400	1,500	1,400	1,400	1,400

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Metals in Water			Sample No	19-18552-6	19-18552-7	19-18552-8	19-18552-9	19-18552-10
Sample Description			Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near	
Sample Date			8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019	
Sodium - Dissolved	0.1	mg/L	12,000	12,000	15,000	12,000	12,000	
Sodium - Total	0.1	mg/L	11,000	11,000	13,000	11,000	11,000	

Metals in Water			Sample No	19-18552-11	19-18552-12	19-18552-13	19-18552-14	19-18552-15
Sample Description			Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top	
Sample Date			8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Aluminium - Total	0.01	mg/L	0.03	0.04	0.02	0.04	0.05	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	0.005	<0.005	<0.005	
Zinc - Total	0.005	mg/L	0.010	0.009	0.010	0.009	0.009	
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Calcium - Dissolved	0.1	mg/L	470	470	480	450	460	
Calcium - Total	0.1	mg/L	480	470	490	450	460	
Potassium - Dissolved	0.1	mg/L	430	440	450	420	430	
Potassium - Total	0.1	mg/L	430	440	450	420	440	
Magnesium - Dissolved	0.1	mg/L	1,400	1,400	1,400	1,300	1,300	
Magnesium - Total	0.1	mg/L	1,400	1,400	1,400	1,400	1,400	
Sodium - Dissolved	0.1	mg/L	12,000	12,000	12,000	11,000	12,000	
Sodium - Total	0.1	mg/L	11,000	11,000	11,000	11,000	11,000	

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Metals in Water			Sample No	19-18552-16	19-18552-17
Sample Description				Locker SW	Tent Island Bottom
Sample Date				8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	<0.01	<0.01	0.06
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	0.030	<0.005	<0.005
Zinc - Total	0.005	mg/L	0.042	0.010	0.010
Arsenic - Dissolved	0.001	mg/L	<0.001	<0.001	0.002
Arsenic - Total	0.001	mg/L	<0.001	<0.001	0.003
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	0.1	470	470
Calcium - Total	0.1	mg/L	0.1	480	480
Potassium - Dissolved	0.1	mg/L	0.5	440	440
Potassium - Total	0.1	mg/L	0.5	440	440
Magnesium - Dissolved	0.1	mg/L	0.2	1,400	1,400
Magnesium - Total	0.1	mg/L	0.2	1,400	1,400
Sodium - Dissolved	0.1	mg/L	0.3	12,000	12,000
Sodium - Total	0.1	mg/L	2.6	11,000	11,000

Total Nitrogen in Water			Sample No	19-18552-1	19-18552-2	19-18552-3	19-18552-4	19-18552-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	0.3	0.4	<0.2	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	0.3	0.4	<0.2	<0.2	<0.2

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Total Nitrogen in Water			Sample No	19-18552-6	19-18552-7	19-18552-8	19-18552-9	19-18552-10
Sample Description				Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near
Sample Date				8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.4	<0.2	0.2	0.2	0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	0.4	<0.2	0.2	0.2	0.2	<0.2

Total Nitrogen in Water			Sample No	19-18552-11	19-18552-12	19-18552-13	19-18552-14	19-18552-15
Sample Description				Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Total Nitrogen in Water			Sample No	19-18552-16	19-18552-17
Sample Description				Locker SW	Tent Island Bottom
Sample Date				8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2

Total Phosphorus in Water			Sample No	19-18552-1	19-18552-2	19-18552-3	19-18552-4	19-18552-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.01	0.01	<0.01	0.01	0.01	0.01

Total Phosphorus in Water			Sample No	19-18552-6	19-18552-7	19-18552-8	19-18552-9	19-18552-10
Sample Description				Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near
Sample Date				8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.02	0.01	<0.01	0.04	0.01	0.01

Total Phosphorus in Water			Sample No	19-18552-11	19-18552-12	19-18552-13	19-18552-14	19-18552-15
Sample Description				Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.01	0.01	0.01	0.01	0.01	0.02

Total Phosphorus in Water			Sample No	19-18552-16	19-18552-17
Sample Description				Locker SW	Tent Island Bottom
Sample Date				8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	0.02	0.02

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Ions by Discrete Analyser			Sample No	19-18552-1	19-18552-2	19-18552-3	19-18552-4	19-18552-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	80	77	76	78	79	
Chloride	5	mg/L	22,000	22,000	22,000	23,000	22,000	
Sulfate	1	mg/L	2,800	2,700	2,700	2,800	2,800	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	

Ions by Discrete Analyser			Sample No	19-18552-6	19-18552-7	19-18552-8	19-18552-9	19-18552-10
Sample Description				Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near
Sample Date				8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	79	80	85	79	80	
Chloride	5	mg/L	22,000	22,000	24,000	22,000	22,000	
Sulfate	1	mg/L	2,800	2,800	3,100	2,800	2,900	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	0.01	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	0.01	<0.01	

Ions by Discrete Analyser			Sample No	19-18552-11	19-18552-12	19-18552-13	19-18552-14	19-18552-15
Sample Description				Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	76	79	77	78	82	
Chloride	5	mg/L	22,000	22,000	21,000	22,000	22,000	
Sulfate	1	mg/L	3,000	2,700	2,700	2,700	2,800	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	

Ions by Discrete Analyser			Sample No	19-18552-16	19-18552-17
Sample Description				Locker SW	Tent Island Bottom
Sample Date				8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result
Bromide	0.1	mg/L	<0.1	79	
Chloride	5	mg/L	<5	22,000	
Sulfate	1	mg/L	<1	2,900	

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Ions by Discrete Analyser			Sample No	19-18552-16	19-18552-17
Sample Description				Locker SW	Tent Island Bottom
Sample Date				8/09/2019	8/09/2019
Filterable Reactive Phosphorus	0.01	mg/L		<0.01	<0.01
Ammonia-N	0.02	mg/L		<0.02	<0.02
Nitrate-N	0.01	mg/L		<0.01	<0.01
NOx-N	0.01	mg/L		<0.01	<0.01
Nitrite-N	0.01	mg/L		<0.01	<0.01

Physical Parameters			Sample No	19-18552-1	19-18552-2	19-18552-3	19-18552-4	19-18552-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.0	8.2	8.2	8.2	8.2	8.2
Conductivity	0.01	mS/cm	53	51	51	53	54	
Total Dissolved Solids	5	mg/L	40,000	40,000	39,000	42,000	41,000	
Total Suspended Solids	5	mg/L	18	15	10	20	12	
Turbidity	0.1	NTU	3.3	0.7	1.1	3.0	3.1	
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	

Physical Parameters			Sample No	19-18552-6	19-18552-7	19-18552-8	19-18552-9	19-18552-10
Sample Description				Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near
Sample Date				8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.2	8.2	8.2	8.2	8.2	8.2
Conductivity	0.01	mS/cm	52	54	58	55	55	
Total Dissolved Solids	5	mg/L	41,000	41,000	45,000	40,000	40,000	
Total Suspended Solids	5	mg/L	17	10	14	21	13	
Turbidity	0.1	NTU	4.7	4.3	3.1	4.8	5.0	
Chlorophyll-a	1	Total µg	<1	1	<1	1	1	

Physical Parameters			Sample No	19-18552-11	19-18552-12	19-18552-13	19-18552-14	19-18552-15
Sample Description				Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.2	8.2	8.2	8.2	8.2	8.2
Conductivity	0.01	mS/cm	52	52	50	51	52	
Total Dissolved Solids	5	mg/L	39,000	39,000	40,000	38,000	40,000	
Total Suspended Solids	5	mg/L	16	17	13	28	26	
Turbidity	0.1	NTU	1.5	1.0	1.1	2.3	4.2	
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	

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Physical Parameters			Sample No	19-18552-16	19-18552-17
Sample Description				Locker SW	Tent Island Bottom
Sample Date				8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result
pH	0.1	pH units	6.0	6.0	8.2
Conductivity	0.01	mS/cm	0.03	0.03	52
Total Dissolved Solids	5	mg/L	17	17	41,000
Total Suspended Solids	5	mg/L	<5	<5	17
Turbidity	0.1	NTU	<0.1	<0.1	8.4
Chlorophyll-a	1	Total µg			<1

Biochemical Oxygen Demand			Sample No	19-18552-1	19-18552-2	19-18552-3	19-18552-4	19-18552-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	19-18552-6	19-18552-7	19-18552-8	19-18552-9	19-18552-10
Sample Description				Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Near
Sample Date				8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	19-18552-11	19-18552-12	19-18552-13	19-18552-14	19-18552-15
Sample Description				Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Tent Island Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	19-18552-16	19-18552-17
Sample Description				Locker SW	Tent Island Bottom
Sample Date				8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5

Subcontracting			Sample No	19-18552-1	19-18552-2	19-18552-3	19-18552-4	19-18552-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				8/09/2019	7/09/2019	7/09/2019	7/09/2019	7/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	2	1	1	1	1	1
Dissolved Organic Carbon	1	mg/L	1	<1	<1	<1	<1	<1

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Subcontracting			Sample No	19-18552-6	19-18552-7	19-18552-8	19-18552-9	19-18552-10
Sample Description			Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	Urala Creek South Off	Urala Creek South Near
Sample Date			8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	1	2	1	1	1
Dissolved Organic Carbon	1	mg/L	<1	<1	1	<1	<1	1

Subcontracting			Sample No	19-18552-11	19-18552-12	19-18552-13	19-18552-14	19-18552-15
Sample Description			Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	Eva Island Bottom	Tent Island Top
Sample Date			8/09/2019	7/09/2019	7/09/2019	8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	<1	1	1	1	1
Dissolved Organic Carbon	1	mg/L	<1	<1	1	<1	<1	<1

Subcontracting			Sample No	19-18552-16	19-18552-17
Sample Description			Locker SW	Tent Island Bottom	Tent Island Bottom
Sample Date			8/09/2019	8/09/2019	8/09/2019
ANALYTE	LOR	Units	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	1	1
Dissolved Organic Carbon	1	mg/L	<1	1	1

Result Definitions

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting
 * Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

LABORATORY REPORT

Job Number: 19-20495
Revision: 00
Date: 6 January 2020

ADDRESS: K+S Salt

ATTENTION: Paula Cartwright

DATE RECEIVED: 2/12/2019

YOUR REFERENCE: University of WA; K+S Project

PURCHASE ORDER: K+S

APPROVALS:

REPORT COMMENTS:

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Samples are analysed on an as received basis unless otherwise noted.

Total and Dissolved Organic Carbon analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 237295

METHOD REFERENCES:

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377
 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561
 Methods prefixed with "EDP" are covered under NATA Accreditation Number: 19290

Method ID	Method Description
ARL No. 007	Benzene, Toluene, Ethylbenzene and Xylenes in Water
ARL No. 005	Polycyclic Aromatic Hydrocarbons in Water
ARL No. 100	Organotins in Water
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 040	Arsenic by Hydride Atomic Absorption
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids
ARL No. 016	Total Suspended Solids
ARL No. 045	Turbidity
ARL No. 141	Chlorophyll-a and Pheophytin-a in Water
ARL No. 011	Biochemical Oxygen Demand
Subcontracting	See Report Comments section for more information.



**WORLD RECOGNISED
ACCREDITATION**
 Accredited for compliance with
 ISO/IEC 17025 - Testing

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BTEX in Water			Sample No	19-20495-1	19-20495-2	19-20495-3	19-20495-4	19-20495-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				30/11/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-20495-6	19-20495-7	19-20495-8	19-20495-9	19-20495-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				1/12/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-20495-11	19-20495-12	19-20495-13	19-20495-14	19-20495-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				30/11/2019	1/12/2019	1/12/2019	1/12/2019	1/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	19-20495-16	19-20495-17	19-20495-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				1/12/2019	1/12/2019	1/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003

PAH in Water			Sample No	19-20495-1	19-20495-2	19-20495-3	19-20495-4	19-20495-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				30/11/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	19-20495-1	19-20495-2	19-20495-3	19-20495-4	19-20495-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				30/11/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-20495-6	19-20495-7	19-20495-8	19-20495-9	19-20495-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				1/12/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-20495-11	19-20495-12	19-20495-13	19-20495-14	19-20495-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				30/11/2019	1/12/2019	1/12/2019	1/12/2019	1/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	19-20495-11	19-20495-12	19-20495-13	19-20495-14	19-20495-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			30/11/2019	1/12/2019	1/12/2019	1/12/2019	1/12/2019	1/12/2019
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	19-20495-16	19-20495-17	19-20495-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			1/12/2019	1/12/2019	1/12/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	

Organotins in Water			Sample No	19-20495-1	19-20495-2	19-20495-3	19-20495-4	19-20495-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			30/11/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

Organotins in Water			Sample No	19-20495-6	19-20495-7	19-20495-8	19-20495-9	19-20495-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			1/12/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<50	<50	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<50	<50	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<20	<20	<2

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Organotins in Water			Sample No	19-20495-11	19-20495-12	19-20495-13	19-20495-14	19-20495-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				30/11/2019	1/12/2019	1/12/2019	1/12/2019	1/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

Organotins in Water			Sample No	19-20495-16	19-20495-17	19-20495-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				1/12/2019	1/12/2019	1/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2

Metals in Water			Sample No	19-20495-1	19-20495-2	19-20495-3	19-20495-4	19-20495-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				30/11/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	0.04	0.05	0.05	0.11	0.11	0.11
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L	<0.005	0.006	0.006	0.006	0.006	0.005
Arsenic - Dissolved	0.001	mg/L	0.001	0.001	0.002	0.002	0.002	0.002
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	480	440	490	480	480	480

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Metals in Water			Sample No	19-20495-1	19-20495-2	19-20495-3	19-20495-4	19-20495-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				30/11/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019
Calcium - Total	0.1	mg/L		490	490	490	510	490
Potassium - Dissolved	0.1	mg/L		410	400	400	400	400
Potassium - Total	0.1	mg/L		450	430	440	440	450
Magnesium - Dissolved	0.1	mg/L		1,400	1,400	1,300	1,300	1,300
Magnesium - Total	0.1	mg/L		1,400	1,400	1,400	1,400	1,400
Sodium - Dissolved	0.1	mg/L		11,000	11,000	11,000	11,000	11,000
Sodium - Total	0.1	mg/L		11,000	11,000	11,000	11,000	11,000

Metals in Water			Sample No	19-20495-6	19-20495-7	19-20495-8	19-20495-9	19-20495-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				1/12/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	0.18	0.07	0.07	0.15	0.27	0.27
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	0.006	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L	0.017	<0.005	<0.005	<0.005	<0.005	0.006
Arsenic - Dissolved	0.001	mg/L	0.001	0.002	0.001	0.001	0.001	0.002
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.003
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	520	490	490	470	470	470
Calcium - Total	0.1	mg/L	630	530	520	550	500	500
Potassium - Dissolved	0.1	mg/L	470	420	400	430	400	400
Potassium - Total	0.1	mg/L	560	470	460	500	450	450
Magnesium - Dissolved	0.1	mg/L	1,500	1,400	1,300	1,400	1,300	1,300
Magnesium - Total	0.1	mg/L	1,500	1,400	1,400	1,400	1,400	1,400

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Metals in Water			Sample No	19-20495-6	19-20495-7	19-20495-8	19-20495-9	19-20495-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			1/12/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019
Sodium - Dissolved	0.1	mg/L	12,000	11,000	11,000	11,000	11,000	11,000
Sodium - Total	0.1	mg/L	13,000	11,000	11,000	11,000	11,000	11,000

Metals in Water			Sample No	19-20495-11	19-20495-12	19-20495-13	19-20495-14	19-20495-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			30/11/2019	1/12/2019	1/12/2019	1/12/2019	1/12/2019	1/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	0.17	0.03	0.03	0.05	0.05	0.05
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.005
Arsenic - Dissolved	0.001	mg/L	0.001	0.002	0.002	0.002	0.002	0.002
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	460	470	470	470	470	470
Calcium - Total	0.1	mg/L	530	480	500	480	510	510
Potassium - Dissolved	0.1	mg/L	420	400	400	400	400	400
Potassium - Total	0.1	mg/L	480	430	450	460	450	450
Magnesium - Dissolved	0.1	mg/L	1,400	1,300	1,300	1,300	1,300	1,300
Magnesium - Total	0.1	mg/L	1,400	1,500	1,400	1,400	1,400	1,400
Sodium - Dissolved	0.1	mg/L	11,000	11,000	11,000	11,000	11,000	11,000
Sodium - Total	0.1	mg/L	11,000	11,000	11,000	11,000	11,000	11,000

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Metals in Water			Sample No	19-20495-16	19-20495-17	19-20495-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			1/12/2019	1/12/2019	1/12/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Aluminium - Dissolved	0.01	mg/L	<0.01	0.02	0.02	
Aluminium - Total	0.01	mg/L	0.05	0.05	0.15	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	<0.005	0.025	<0.005	
Zinc - Total	0.005	mg/L	<0.005	0.030	0.015	
Arsenic - Dissolved	0.001	mg/L	0.002	<0.001	0.001	
Arsenic - Total	0.001	mg/L	0.002	<0.001	0.002	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	0.001	0.11	0.001	
Copper - Total	0.001	mg/L	0.001	0.12	0.001	
Lead - Dissolved	0.001	mg/L	<0.001	0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Calcium - Dissolved	0.1	mg/L	480	76	510	
Calcium - Total	0.1	mg/L	500	83	590	
Potassium - Dissolved	0.1	mg/L	400	3.4	480	
Potassium - Total	0.1	mg/L	440	3.7	540	
Magnesium - Dissolved	0.1	mg/L	1,200	31	1,400	
Magnesium - Total	0.1	mg/L	1,400	31	1,500	
Sodium - Dissolved	0.1	mg/L	11,000	110	11,000	
Sodium - Total	0.1	mg/L	11,000	120	11,000	

Total Nitrogen in Water			Sample No	19-20495-1	19-20495-2	19-20495-3	19-20495-4	19-20495-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			30/11/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Total Nitrogen	0.2	mg/L	<0.2	0.4	<0.2	0.3	0.3	
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	0.4	<0.2	0.3	0.3	

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Total Nitrogen in Water			Sample No	19-20495-6	19-20495-7	19-20495-8	19-20495-9	19-20495-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			1/12/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.3	0.3	3.3	<0.2	0.4	
Total Kjeldahl Nitrogen	0.2	mg/L	0.3	0.3	3.3	<0.2	0.4	

Total Nitrogen in Water			Sample No	19-20495-11	19-20495-12	19-20495-13	19-20495-14	19-20495-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			30/11/2019	1/12/2019	1/12/2019	1/12/2019	1/12/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.2	<0.2	<0.2	<0.2	0.4	
Total Kjeldahl Nitrogen	0.2	mg/L	0.2	<0.2	<0.2	<0.2	0.4	

Total Nitrogen in Water			Sample No	19-20495-16	19-20495-17	19-20495-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			1/12/2019	1/12/2019	1/12/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.7	2.9	0.7	
Total Kjeldahl Nitrogen	0.2	mg/L	0.7	1.1	0.7	

Total Phosphorus in Water			Sample No	19-20495-1	19-20495-2	19-20495-3	19-20495-4	19-20495-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			30/11/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.01	0.01	0.01	0.01	0.01	0.01

Total Phosphorus in Water			Sample No	19-20495-6	19-20495-7	19-20495-8	19-20495-9	19-20495-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			1/12/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.03	0.02	0.01	0.02	0.04	

Total Phosphorus in Water			Sample No	19-20495-11	19-20495-12	19-20495-13	19-20495-14	19-20495-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			30/11/2019	1/12/2019	1/12/2019	1/12/2019	1/12/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.02	0.01	0.02	0.02	0.02	

Total Phosphorus in Water			Sample No	19-20495-16	19-20495-17	19-20495-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			1/12/2019	1/12/2019	1/12/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.02	0.42	0.04	

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Ions by Discrete Analyser			Sample No	19-20495-1	19-20495-2	19-20495-3	19-20495-4	19-20495-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				30/11/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	62	65	65	68	64	
Chloride	5	mg/L	21,000	21,000	21,000	21,000	21,000	21,000
Sulfate	1	mg/L	2,800	2,700	2,800	2,800	2,900	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	0.03	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No	19-20495-6	19-20495-7	19-20495-8	19-20495-9	19-20495-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				1/12/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	80	64	64	70	61	
Chloride	5	mg/L	22,000	22,000	22,000	22,000	22,000	22,000
Sulfate	1	mg/L	3,300	2,900	2,900	2,900	2,900	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No	19-20495-11	19-20495-12	19-20495-13	19-20495-14	19-20495-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				30/11/2019	1/12/2019	1/12/2019	1/12/2019	1/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	67	60	60	55	59	
Chloride	5	mg/L	22,000	22,000	22,000	22,000	22,000	22,000
Sulfate	1	mg/L	2,900	2,800	2,800	2,800	2,800	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No	19-20495-16	19-20495-17	19-20495-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				1/12/2019	1/12/2019	1/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Bromide	0.1	mg/L	55	0.4	74	
Chloride	5	mg/L	22,000	250	22,000	
Sulfate	1	mg/L	2,800	24	3,000	

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Ions by Discrete Analyser			Sample No	19-20495-16	19-20495-17	19-20495-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			1/12/2019	1/12/2019	1/12/2019	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	0.09	<0.01	
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	1.8	<0.01	
NOx-N	0.01	mg/L	<0.01	1.8	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	

Physical Parameters			Sample No	19-20495-1	19-20495-2	19-20495-3	19-20495-4	19-20495-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			30/11/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.1	8.1	8.1	8.1	8.1	8.1
Conductivity	0.01	mS/cm	49	51	51	52	52	
Total Dissolved Solids	5	mg/L	40,000	39,000	39,000	41,000	40,000	
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	6	
Turbidity	0.1	NTU	0.3	0.4	1.2	2.5	3.9	
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	

Physical Parameters			Sample No	19-20495-6	19-20495-7	19-20495-8	19-20495-9	19-20495-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			1/12/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.0	8.1	8.1	8.1	8.1	8.1
Conductivity	0.01	mS/cm	61	52	51	56	52	
Total Dissolved Solids	5	mg/L	43,000	40,000	41,000	41,000	41,000	
Total Suspended Solids	5	mg/L	5	<5	<5	<5	8	
Turbidity	0.1	NTU	6.0	1.4	1.6	3.9	6.2	
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	

Physical Parameters			Sample No	19-20495-11	19-20495-12	19-20495-13	19-20495-14	19-20495-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			30/11/2019	1/12/2019	1/12/2019	1/12/2019	1/12/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.1	8.2	8.1	8.2	8.2	8.2
Conductivity	0.01	mS/cm	54	51	51	50	51	
Total Dissolved Solids	5	mg/L	41,000	39,000	39,000	41,000	38,000	
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5	
Turbidity	0.1	NTU	3.8	0.9	0.6	0.7	0.7	
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	

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Physical Parameters			Sample No	19-20495-16	19-20495-17	19-20495-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				1/12/2019	1/12/2019	1/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
pH	0.1	pH units	8.1	7.7	8.0	
Conductivity	0.01	mS/cm	50	1.7	61	
Total Dissolved Solids	5	mg/L	39,000	770	43,000	
Total Suspended Solids	5	mg/L	<5	<5	<5	
Turbidity	0.1	NTU	0.9	0.2	5.8	
Chlorophyll-a	1	Total µg	<1	<1	<1	

Biochemical Oxygen Demand			Sample No	19-20495-1	19-20495-2	19-20495-3	19-20495-4	19-20495-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				30/11/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	

Biochemical Oxygen Demand			Sample No	19-20495-6	19-20495-7	19-20495-8	19-20495-9	19-20495-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				1/12/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	

Biochemical Oxygen Demand			Sample No	19-20495-11	19-20495-12	19-20495-13	19-20495-14	19-20495-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				30/11/2019	1/12/2019	1/12/2019	1/12/2019	1/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	

Biochemical Oxygen Demand			Sample No	19-20495-16	19-20495-17	19-20495-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				1/12/2019	1/12/2019	1/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5

Subcontracting			Sample No	19-20495-1	19-20495-2	19-20495-3	19-20495-4	19-20495-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				30/11/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Total Organic Carbon	1	mg/L	1	2	<1	<1	<1	
Dissolved Organic Carbon	1	mg/L	1	1	<1	<1	<1	

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Subcontracting			Sample No	19-20495-6	19-20495-7	19-20495-8	19-20495-9	19-20495-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			1/12/2019	30/11/2019	30/11/2019	30/11/2019	30/11/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	2	<1	1	1	1	1
Dissolved Organic Carbon	1	mg/L	2	<1	1	1	1	1

Subcontracting			Sample No	19-20495-11	19-20495-12	19-20495-13	19-20495-14	19-20495-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			30/11/2019	1/12/2019	1/12/2019	1/12/2019	1/12/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	<1	<1	<1	<1	<1
Dissolved Organic Carbon	1	mg/L	1	<1	<1	<1	<1	<1

Subcontracting			Sample No	19-20495-16	19-20495-17	19-20495-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			1/12/2019	1/12/2019	1/12/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	<1	2	
Dissolved Organic Carbon	1	mg/L	<1	<1	2	

Result Definitions

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting
* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

LABORATORY REPORT

Job Number: 20-00033
Revision: 00
Date: 30 January 2020

ADDRESS: K+S Salt


ATTENTION: Paula Cartwright

DATE RECEIVED: 31/12/2019

YOUR REFERENCE: University of WA; K+S Project

PURCHASE ORDER: K+S

APPROVALS:



Paul Nottle
Organics Manager

Douglas Todd
Laboratory Manager

Sean Sangster
Inorganics Supervisor

Sam Becker
Inorganics Manager

REPORT COMMENTS:

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Samples are analysed on an as received basis unless otherwise noted.

Total and Dissolved Organic Carbon analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 238446

METHOD REFERENCES:

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377
 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561
 Methods prefixed with "EDP" are covered under NATA Accreditation Number: 19290

Method ID	Method Description
ARL No. 007	Benzene, Toluene, Ethylbenzene and Xylenes in Water
ARL No. 005	Polycyclic Aromatic Hydrocarbons in Water
ARL No. 100	Organotins in Water
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 040	Arsenic by Hydride Atomic Absorption
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids
ARL No. 016	Total Suspended Solids
ARL No. 045	Turbidity
ARL No. 011	Biochemical Oxygen Demand
Subcontracting	See Report Comments section for more information.



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BTEX in Water			Sample No	20-00033-1	20-00033-2	20-00033-3	20-00033-4	20-00033-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	20-00033-6	20-00033-7	20-00033-8	20-00033-9	20-00033-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	20-00033-11	20-00033-12	20-00033-13	20-00033-14	20-00033-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	20-00033-16	20-00033-17	20-00033-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003

PAH in Water			Sample No	20-00033-1	20-00033-2	20-00033-3	20-00033-4	20-00033-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	20-00033-1	20-00033-2	20-00033-3	20-00033-4	20-00033-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	20-00033-6	20-00033-7	20-00033-8	20-00033-9	20-00033-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	20-00033-11	20-00033-12	20-00033-13	20-00033-14	20-00033-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	20-00033-11	20-00033-12	20-00033-13	20-00033-14	20-00033-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	20-00033-16	20-00033-17	20-00033-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	

Organotins in Water			Sample No	20-00033-1	20-00033-2	20-00033-3	20-00033-4	20-00033-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	

Organotins in Water			Sample No	20-00033-6	20-00033-7	20-00033-8	20-00033-9	20-00033-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	

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Organotins in Water			Sample No	20-00033-11	20-00033-12	20-00033-13	20-00033-14	20-00033-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

Organotins in Water			Sample No	20-00033-16	20-00033-17	20-00033-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2

Metals in Water			Sample No	20-00033-1	20-00033-2	20-00033-3	20-00033-4	20-00033-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	0.02	0.02	<0.01	0.06	0.02	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	0.008	0.007	0.007	<0.005	<0.005	
Zinc - Total	0.005	mg/L	0.008	0.007	0.007	<0.005	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.003	0.003	0.002	0.002	0.002	
Arsenic - Total	0.001	mg/L	0.002	0.003	0.003	0.003	0.003	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Calcium - Dissolved	0.1	mg/L	430	420	420	420	430	

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Metals in Water			Sample No	20-00033-1	20-00033-2	20-00033-3	20-00033-4	20-00033-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
Calcium - Total	0.1	mg/L		480	460	460	440	470
Potassium - Dissolved	0.1	mg/L		420	420	410	420	420
Potassium - Total	0.1	mg/L		480	460	450	460	460
Magnesium - Dissolved	0.1	mg/L		1,500	1,400	1,400	1,500	1,500
Magnesium - Total	0.1	mg/L		1,500	1,400	1,400	1,500	1,500
Sodium - Dissolved	0.1	mg/L		11,000	11,000	11,000	12,000	11,000
Sodium - Total	0.1	mg/L		11,000	11,000	11,000	12,000	11,000

Metals in Water			Sample No	20-00033-6	20-00033-7	20-00033-8	20-00033-9	20-00033-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	0.02	0.07	0.04	0.11	0.02	0.02
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Arsenic - Total	0.001	mg/L	0.003	0.003	0.003	0.003	0.003	0.003
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	440	460	440	460	450	450
Calcium - Total	0.1	mg/L	480	500	480	500	500	500
Potassium - Dissolved	0.1	mg/L	410	440	420	430	420	420
Potassium - Total	0.1	mg/L	460	470	460	460	470	470
Magnesium - Dissolved	0.1	mg/L	1,400	1,500	1,400	1,500	1,400	1,400
Magnesium - Total	0.1	mg/L	1,500	1,500	1,500	1,500	1,500	1,500

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Metals in Water			Sample No	20-00033-6	20-00033-7	20-00033-8	20-00033-9	20-00033-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
Sodium - Dissolved	0.1	mg/L	11,000	12,000	11,000	11,000	11,000	11,000
Sodium - Total	0.1	mg/L	11,000	12,000	11,000	12,000	12,000	12,000

Metals in Water			Sample No	20-00033-11	20-00033-12	20-00033-13	20-00033-14	20-00033-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	0.03	0.01	0.02	0.01	0.01	0.01
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L	<0.005	0.006	0.022	0.005	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L	0.002	0.003	0.003	0.003	0.003	0.003
Arsenic - Total	0.001	mg/L	0.003	0.003	0.003	0.003	0.003	0.003
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	440	440	430	430	430	430
Calcium - Total	0.1	mg/L	460	450	450	470	460	460
Potassium - Dissolved	0.1	mg/L	410	400	400	400	400	400
Potassium - Total	0.1	mg/L	440	420	440	430	430	430
Magnesium - Dissolved	0.1	mg/L	1,400	1,400	1,400	1,400	1,400	1,300
Magnesium - Total	0.1	mg/L	1,400	1,400	1,400	1,400	1,400	1,400
Sodium - Dissolved	0.1	mg/L	11,000	10,000	10,000	11,000	11,000	11,000
Sodium - Total	0.1	mg/L	11,000	11,000	11,000	11,000	11,000	11,000

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Metals in Water			Sample No	20-00033-16	20-00033-17	20-00033-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			29/12/2019	29/12/2019	29/12/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Aluminium - Total	0.01	mg/L	0.01	<0.01	0.01	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	
Zinc - Total	0.005	mg/L	<0.005	0.006	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.003	<0.001	0.003	
Arsenic - Total	0.001	mg/L	0.003	<0.001	0.003	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	0.001	<0.001	
Calcium - Dissolved	0.1	mg/L	450	0.8	440	
Calcium - Total	0.1	mg/L	450	0.8	450	
Potassium - Dissolved	0.1	mg/L	410	1.2	410	
Potassium - Total	0.1	mg/L	430	1.2	420	
Magnesium - Dissolved	0.1	mg/L	1,400	2.8	1,300	
Magnesium - Total	0.1	mg/L	1,400	2.4	1,300	
Sodium - Dissolved	0.1	mg/L	11,000	36	11,000	
Sodium - Total	0.1	mg/L	11,000	36	12,000	

Total Nitrogen in Water			Sample No	20-00033-1	20-00033-2	20-00033-3	20-00033-4	20-00033-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Total Nitrogen	0.2	mg/L	0.2	0.2	0.3	0.3	0.7	
Total Kjeldahl Nitrogen	0.2	mg/L	0.2	0.2	0.3	0.3	0.7	

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Total Nitrogen in Water			Sample No	20-00033-6	20-00033-7	20-00033-8	20-00033-9	20-00033-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.2	0.3	0.3	0.2	0.2	0.2
Total Kjeldahl Nitrogen	0.2	mg/L	0.2	0.3	0.3	0.2	0.2	0.2

Total Nitrogen in Water			Sample No	20-00033-11	20-00033-12	20-00033-13	20-00033-14	20-00033-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.2	0.2	0.2	0.2	0.2	0.2
Total Kjeldahl Nitrogen	0.2	mg/L	0.2	0.2	0.2	0.2	0.2	0.2

Total Nitrogen in Water			Sample No	20-00033-16	20-00033-17	20-00033-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			29/12/2019	29/12/2019	29/12/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Total Nitrogen	0.2	mg/L	0.3	7.4	0.3	
Total Kjeldahl Nitrogen	0.2	mg/L	0.3	<0.2	0.3	

Total Phosphorus in Water			Sample No	20-00033-1	20-00033-2	20-00033-3	20-00033-4	20-00033-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.02	0.02	0.02	0.02	0.02	0.02

Total Phosphorus in Water			Sample No	20-00033-6	20-00033-7	20-00033-8	20-00033-9	20-00033-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.02	0.02	0.02	0.02	0.02	0.02

Total Phosphorus in Water			Sample No	20-00033-11	20-00033-12	20-00033-13	20-00033-14	20-00033-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.02	0.02	0.02	0.02	0.02	0.02

Total Phosphorus in Water			Sample No	20-00033-16	20-00033-17	20-00033-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			29/12/2019	29/12/2019	29/12/2019	
ANALYTE	LOR	Units	Result	Result	Result	
Total Phosphorus	0.01	mg/L	0.02	0.13	0.03	

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Ions by Discrete Analyser			Sample No	20-00033-1	20-00033-2	20-00033-3	20-00033-4	20-00033-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	68	70	69	71	71	71
Chloride	5	mg/L	21,000	21,000	21,000	21,000	21,000	21,000
Sulfate	1	mg/L	3,200	3,300	3,300	3,400	3,400	3,400
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	0.02	0.02	0.02	0.03	0.03	0.03
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No	20-00033-6	20-00033-7	20-00033-8	20-00033-9	20-00033-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	79	82	78	81	80	80
Chloride	5	mg/L	21,000	21,000	21,000	21,000	21,000	21,000
Sulfate	1	mg/L	3,400	3,600	3,300	3,600	3,500	3,500
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	0.02	0.02	0.03	0.03	0.03	0.03
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No	20-00033-11	20-00033-12	20-00033-13	20-00033-14	20-00033-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	71	71	69	68	70	70
Chloride	5	mg/L	21,000	21,000	21,000	21,000	21,000	21,000
Sulfate	1	mg/L	3,300	3,200	3,200	3,200	3,200	3,200
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ammonia-N	0.02	mg/L	0.02	0.03	0.02	0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Ions by Discrete Analyser			Sample No	20-00033-16	20-00033-17	20-00033-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Bromide	0.1	mg/L	68	<0.1	67	67
Chloride	5	mg/L	21,000	39	21,000	21,000
Sulfate	1	mg/L	3,300	9	3,200	3,200

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Ions by Discrete Analyser			Sample No	20-00033-16	20-00033-17	20-00033-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			29/12/2019	29/12/2019	29/12/2019	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	0.01	<0.01	
Ammonia-N	0.02	mg/L	0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	7.4	<0.01	
NOx-N	0.01	mg/L	<0.01	7.4	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	

Physical Parameters			Sample No	20-00033-1	20-00033-2	20-00033-3	20-00033-4	20-00033-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.1	8.2	8.2	8.2	8.2	8.2
Conductivity	0.01	mS/cm	62	61	61	63	63	63
Total Dissolved Solids	5	mg/L	38,000	37,000	37,000	38,000	38,000	38,000
Total Suspended Solids	5	mg/L	8	5	<5	10	9	9
Turbidity	0.1	NTU	0.3	0.4	0.4	1.6	0.6	0.6

Physical Parameters			Sample No	20-00033-6	20-00033-7	20-00033-8	20-00033-9	20-00033-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.2	8.2	8.2	8.2	8.2	8.2
Conductivity	0.01	mS/cm	62	64	66	63	62	62
Total Dissolved Solids	5	mg/L	37,000	38,000	37,000	38,000	37,000	37,000
Total Suspended Solids	5	mg/L	<5	5	6	9	<5	<5
Turbidity	0.1	NTU	0.5	1.3	1.0	1.0	0.9	0.9

Physical Parameters			Sample No	20-00033-11	20-00033-12	20-00033-13	20-00033-14	20-00033-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.2	8.2	8.2	8.2	8.2	8.2
Conductivity	0.01	mS/cm	62	61	60	61	60	60
Total Dissolved Solids	5	mg/L	37,000	37,000	37,000	38,000	37,000	37,000
Total Suspended Solids	5	mg/L	<5	6	<5	<5	<5	<5
Turbidity	0.1	NTU	0.9	0.3	0.4	0.3	0.3	0.3

Physical Parameters			Sample No	20-00033-16	20-00033-17	20-00033-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			29/12/2019	29/12/2019	29/12/2019	
ANALYTE	LOR	Units	Result	Result	Result	Result
pH	0.1	pH units	8.2	6.4	8.2	8.2
Conductivity	0.01	mS/cm	60	0.23	60	60
Total Dissolved Solids	5	mg/L	37,000	140	37,000	37,000
Total Suspended Solids	5	mg/L	<5	<5	<5	<5

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Physical Parameters			Sample No	20-00033-16	20-00033-17	20-00033-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				29/12/2019	29/12/2019	29/12/2019
Turbidity	0.1	NTU		0.5	0.1	0.3

Biochemical Oxygen Demand			Sample No	20-00033-1	20-00033-2	20-00033-3	20-00033-4	20-00033-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	20-00033-6	20-00033-7	20-00033-8	20-00033-9	20-00033-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	20-00033-11	20-00033-12	20-00033-13	20-00033-14	20-00033-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	20-00033-16	20-00033-17	20-00033-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5

Subcontracting			Sample No	20-00033-1	20-00033-2	20-00033-3	20-00033-4	20-00033-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	1	1	2	1	1
Dissolved Organic Carbon	1	mg/L	<1	1	1	1	1	1

Subcontracting			Sample No	20-00033-6	20-00033-7	20-00033-8	20-00033-9	20-00033-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	1	1	1	1	1
Dissolved Organic Carbon	1	mg/L	1	1	1	1	1	1

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Subcontracting		Sample No	20-00033-11	20-00033-12	20-00033-13	20-00033-14	20-00033-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date			29/12/2019	29/12/2019	29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	<1	<1	<1	<1
Dissolved Organic Carbon	1	mg/L	<1	<1	<1	<1	<1

Subcontracting		Sample No	20-00033-16	20-00033-17	20-00033-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom
Sample Date			29/12/2019	29/12/2019	29/12/2019
ANALYTE	LOR	Units	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	<1	<1
Dissolved Organic Carbon	1	mg/L	<1	<1	<1

Result Definitions

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting
* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

LABORATORY REPORT

Job Number: 20-02322
Revision: 01
Date: 4 March 2020

ADDRESS: K+S Salt

ATTENTION: Paula Cartwright

DATE RECEIVED: 6/02/2020

YOUR REFERENCE: University of WA; K+S Project

PURCHASE ORDER: K+S

APPROVALS:



Paul Nottle
Organics Manager



Min How
Organics Supervisor



Douglas Todd
Laboratory Manager



Sam Becker
Inorganics Manager

REPORT COMMENTS:

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Samples are analysed on an as received basis unless otherwise noted.

Total and Dissolved Organic Carbon analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 240017

METHOD REFERENCES:

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377
 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561
 Methods prefixed with "EDP" are covered under NATA Accreditation Number: 19290

Method ID	Method Description
ARL No. 007	Benzene, Toluene, Ethylbenzene and Xylenes in Water
ARL No. 005	Polycyclic Aromatic Hydrocarbons in Water
ARL No. 100	Organotins in Water
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 040	Arsenic by Hydride Atomic Absorption
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids
ARL No. 016	Total Suspended Solids
ARL No. 045	Turbidity
ARL No. 141	Chlorophyll-a and Pheophytin-a in Water
ARL No. 011	Biochemical Oxygen Demand
Subcontracting	See Report Comments section for more information.



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Job No: 20-02322

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Revision: 01

Date: 4/03/20

BTEX in Water			Sample No	20-02322-1	20-02322-2	20-02322-3	20-02322-4	20-02322-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	20-02322-6	20-02322-7	20-02322-8	20-02322-9	20-02322-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	20-02322-11	20-02322-12	20-02322-13	20-02322-14	20-02322-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				4/02/2020	4/02/2020	4/02/2020	5/02/2020	5/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

BTEX in Water			Sample No	20-02322-16	20-02322-17	20-02322-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				5/02/2020	5/02/2020	5/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003

PAH in Water			Sample No	20-02322-1	20-02322-2	20-02322-3	20-02322-4	20-02322-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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PAH in Water			Sample No	20-02322-1	20-02322-2	20-02322-3	20-02322-4	20-02322-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020
Fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	20-02322-6	20-02322-7	20-02322-8	20-02322-9	20-02322-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	

PAH in Water			Sample No	20-02322-11	20-02322-12	20-02322-13	20-02322-14	20-02322-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				4/02/2020	4/02/2020	4/02/2020	5/02/2020	5/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	

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PAH in Water			Sample No	20-02322-11	20-02322-12	20-02322-13	20-02322-14	20-02322-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			4/02/2020	4/02/2020	4/02/2020	5/02/2020	5/02/2020	
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PAH in Water			Sample No	20-02322-16	20-02322-17	20-02322-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			5/02/2020	5/02/2020	5/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	
Naphthalene	0.1	µg/L	<0.1	<0.1	<0.1	
2-Methylnaphthalene	0.1	µg/L	<0.1	<0.1	<0.1	
Acenaphthylene	0.1	µg/L	<0.1	<0.1	<0.1	
Acenaphthene	0.1	µg/L	<0.1	<0.1	<0.1	
Fluorene	0.1	µg/L	<0.1	<0.1	<0.1	
Phenanthrene	0.1	µg/L	<0.1	<0.1	<0.1	
Anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Benz(a)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Chrysene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(b)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(k)fluoranthene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(a)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Indeno(1,2,3-c,d)pyrene	0.1	µg/L	<0.1	<0.1	<0.1	
Dibenz(a,h)anthracene	0.1	µg/L	<0.1	<0.1	<0.1	
Benzo(ghi)perylene	0.1	µg/L	<0.1	<0.1	<0.1	

Organotins in Water			Sample No	20-02322-1	20-02322-2	20-02322-3	20-02322-4	20-02322-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

Organotins in Water			Sample No	20-02322-6	20-02322-7	20-02322-8	20-02322-9	20-02322-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

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Organotins in Water			Sample No	20-02322-11	20-02322-12	20-02322-13	20-02322-14	20-02322-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			4/02/2020	4/02/2020	4/02/2020	5/02/2020	5/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2	<2	<2

Organotins in Water			Sample No	20-02322-16	20-02322-17	20-02322-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			5/02/2020	5/02/2020	5/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result
Monobutyl tin	5	ngSn/L	<5	<5	<5	<5
Dibutyl tin	5	ngSn/L	<5	<5	<5	<5
Tributyl tin	2	ngSn/L	<2	<2	<2	<2

Metals in Water			Sample No	20-02322-1	20-02322-2	20-02322-3	20-02322-4	20-02322-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	0.06	0.04	0.05	0.08	0.04	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Arsenic - Total	0.001	mg/L	0.002	0.002	0.003	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	560	550	550	580	610	

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Metals in Water			Sample No	20-02322-1	20-02322-2	20-02322-3	20-02322-4	20-02322-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020	
Calcium - Total	0.1	mg/L	590	570	580	590	610	
Potassium - Dissolved	0.1	mg/L	460	460	460	470	470	
Potassium - Total	0.1	mg/L	500	490	500	510	540	
Magnesium - Dissolved	0.1	mg/L	1,700	1,700	1,700	1,700	1,800	
Magnesium - Total	0.1	mg/L	1,800	1,700	1,700	1,700	1,800	
Sodium - Dissolved	0.1	mg/L	11,000	11,000	11,000	11,000	11,000	
Sodium - Total	0.1	mg/L	12,000	12,000	12,000	12,000	12,000	

Metals in Water			Sample No	20-02322-6	20-02322-7	20-02322-8	20-02322-9	20-02322-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Aluminium - Total	0.01	mg/L	0.08	0.02	0.02	0.09	<0.01	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Zinc - Total	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper - Total	0.001	mg/L	0.001	<0.001	<0.001	0.001	<0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Calcium - Dissolved	0.1	mg/L	650	590	560	700	550	
Calcium - Total	0.1	mg/L	650	630	600	740	560	
Potassium - Dissolved	0.1	mg/L	580	490	480	620	470	
Potassium - Total	0.1	mg/L	590	560	540	670	490	
Magnesium - Dissolved	0.1	mg/L	1,900	1,700	1,700	2,000	1,700	
Magnesium - Total	0.1	mg/L	1,900	1,800	1,800	2,100	1,700	

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Metals in Water			Sample No	20-02322-6	20-02322-7	20-02322-8	20-02322-9	20-02322-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020
Sodium - Dissolved	0.1	mg/L	11,000	11,000	11,000	14,000	11,000	
Sodium - Total	0.1	mg/L	12,000	12,000	12,000	15,000	12,000	

Metals in Water			Sample No	20-02322-11	20-02322-12	20-02322-13	20-02322-14	20-02322-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			4/02/2020	4/02/2020	4/02/2020	5/02/2020	5/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aluminium - Total	0.01	mg/L	0.02	0.02	0.02	<0.01	<0.01	<0.01
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc - Total	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Arsenic - Total	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium - Dissolved	0.1	mg/L	590	540	540	550	570	
Calcium - Total	0.1	mg/L	610	540	560	560	610	
Potassium - Dissolved	0.1	mg/L	510	460	460	460	480	
Potassium - Total	0.1	mg/L	540	480	500	480	490	
Magnesium - Dissolved	0.1	mg/L	1,800	1,700	1,700	1,700	1,800	
Magnesium - Total	0.1	mg/L	1,800	1,600	1,700	1,900	2,000	
Sodium - Dissolved	0.1	mg/L	12,000	11,000	11,000	11,000	11,000	
Sodium - Total	0.1	mg/L	12,000	12,000	11,000	12,000	12,000	

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Metals in Water			Sample No	20-02322-16	20-02322-17	20-02322-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			5/02/2020	5/02/2020	5/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Aluminium - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Manganese - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Tin - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	
Vanadium - Total	0.01	mg/L	<0.01	<0.01	<0.01	
Zinc - Dissolved	0.005	mg/L	<0.005	0.009	<0.005	
Zinc - Total	0.005	mg/L	<0.005	0.049	<0.005	
Arsenic - Dissolved	0.001	mg/L	0.002	<0.001	0.002	
Arsenic - Total	0.001	mg/L	0.002	<0.001	0.002	
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Chromium - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Cobalt - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	<0.001	0.006	<0.001	
Copper - Total	0.001	mg/L	<0.001	0.21	<0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Lead - Total	0.001	mg/L	<0.001	0.002	<0.001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Nickel - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Cadmium - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Mercury - Total	0.0001	mg/L	<0.0001	<0.0001	<0.0001	
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	
Selenium - Total	0.001	mg/L	<0.001	<0.001	<0.001	
Calcium - Dissolved	0.1	mg/L	600	39	550	
Calcium - Total	0.1	mg/L	620	41	590	
Potassium - Dissolved	0.1	mg/L	540	6.2	470	
Potassium - Total	0.1	mg/L	610	6.3	520	
Magnesium - Dissolved	0.1	mg/L	1,900	7.0	1,700	
Magnesium - Total	0.1	mg/L	1,900	3.9	1,900	
Sodium - Dissolved	0.1	mg/L	11,000	92	11,000	
Sodium - Total	0.1	mg/L	12,000	96	12,000	

Total Nitrogen in Water			Sample No	20-02322-1	20-02322-2	20-02322-3	20-02322-4	20-02322-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Total Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	0.2	<0.2	
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	0.2	<0.2	

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Total Nitrogen in Water			Sample No	20-02322-6	20-02322-7	20-02322-8	20-02322-9	20-02322-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.2	0.3	<0.2	<0.2	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	0.2	0.3	<0.2	<0.2	<0.2	<0.2

Total Nitrogen in Water			Sample No	20-02322-11	20-02322-12	20-02322-13	20-02322-14	20-02322-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			4/02/2020	4/02/2020	4/02/2020	5/02/2020	5/02/2020	5/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	0.2	0.2	<0.2	0.2	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	0.2	0.2	<0.2	0.2	<0.2	<0.2

Total Nitrogen in Water			Sample No	20-02322-16	20-02322-17	20-02322-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			5/02/2020	5/02/2020	5/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	2.8	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	1.2	<0.2	<0.2

Total Phosphorus in Water			Sample No	20-02322-1	20-02322-2	20-02322-3	20-02322-4	20-02322-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.02	0.02	0.02	0.01	<0.01	<0.01

Total Phosphorus in Water			Sample No	20-02322-6	20-02322-7	20-02322-8	20-02322-9	20-02322-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	0.02	<0.01	0.02	0.01	0.01

Total Phosphorus in Water			Sample No	20-02322-11	20-02322-12	20-02322-13	20-02322-14	20-02322-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			4/02/2020	4/02/2020	4/02/2020	5/02/2020	5/02/2020	5/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.02	0.01	0.01	0.01	0.01	0.01

Total Phosphorus in Water			Sample No	20-02322-16	20-02322-17	20-02322-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			5/02/2020	5/02/2020	5/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	<0.01	0.24	0.02	0.02

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Ions by Discrete Analyser			Sample No	20-02322-1	20-02322-2	20-02322-3	20-02322-4	20-02322-5
Sample Description				Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top
Sample Date				4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	69	64	69	63	76	
Chloride	5	mg/L	21,000	21,000	22,000	22,000	22,000	
Sulfate	1	mg/L	2,900	2,900	3,100	2,900	3,000	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	

Ions by Discrete Analyser			Sample No	20-02322-6	20-02322-7	20-02322-8	20-02322-9	20-02322-10
Sample Description				Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off
Sample Date				4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	66	63	69	81	66	
Chloride	5	mg/L	22,000	22,000	22,000	28,000	22,000	
Sulfate	1	mg/L	3,000	3,100	2,900	3,600	2,900	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	0.02	<0.01	<0.01	<0.01	
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
NOx-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	

Ions by Discrete Analyser			Sample No	20-02322-11	20-02322-12	20-02322-13	20-02322-14	20-02322-15
Sample Description				Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom
Sample Date				4/02/2020	4/02/2020	4/02/2020	5/02/2020	5/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Bromide	0.1	mg/L	68	83	66	66	73	
Chloride	5	mg/L	25,000	23,000	21,000	21,000	23,000	
Sulfate	1	mg/L	3,100	2,900	2,900	2,900	3,100	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	<0.01	0.02	<0.01	<0.01	
NOx-N	0.01	mg/L	<0.01	<0.01	0.02	<0.01	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	

Ions by Discrete Analyser			Sample No	20-02322-16	20-02322-17	20-02322-18
Sample Description				Tent Island Top	Locker SW	Tent Island Bottom
Sample Date				5/02/2020	5/02/2020	5/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result
Bromide	0.1	mg/L	63	3.0	63	
Chloride	5	mg/L	22,000	220	22,000	
Sulfate	1	mg/L	3,000	30	3,100	

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Ions by Discrete Analyser			Sample No	20-02322-16	20-02322-17	20-02322-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			5/02/2020	5/02/2020	5/02/2020	
Filterable Reactive Phosphorus	0.01	mg/L	<0.01	0.08	<0.01	
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	
Nitrate-N	0.01	mg/L	<0.01	1.6	<0.01	
NOx-N	0.01	mg/L	<0.01	1.6	<0.01	
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	

Physical Parameters			Sample No	20-02322-1	20-02322-2	20-02322-3	20-02322-4	20-02322-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	7.9	8.0	8.0	8.0	8.0	8.0
Conductivity	0.01	mS/cm	52	52	52	52	52	52
Total Dissolved Solids	5	mg/L	38,000	39,000	38,000	38,000	38,000	39,000
Total Suspended Solids	5	mg/L	5	<5	<5	<5	<5	<5
Turbidity	0.1	NTU	3.5	1.6	1.7	1.7	1.7	1.7
Chlorophyll-a	1	Total µg	<1	<1	<1	<1	<1	<1

Physical Parameters			Sample No	20-02322-6	20-02322-7	20-02322-8	20-02322-9	20-02322-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.0	8.1	8.1	8.0	8.1	
Conductivity	0.01	mS/cm	59	53	53	61	52	
Total Dissolved Solids	5	mg/L	39,000	38,000	38,000	48,000	40,000	
Total Suspended Solids	5	mg/L	<5	<5	<5	6	6	
Turbidity	0.1	NTU	2.6	1.3	1.2	3.6	0.9	
Chlorophyll-a	1	Total µg	<1	3	<1	<1	<1	

Physical Parameters			Sample No	20-02322-11	20-02322-12	20-02322-13	20-02322-14	20-02322-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			4/02/2020	4/02/2020	4/02/2020	5/02/2020	5/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
pH	0.1	pH units	8.1	8.1	8.1	8.1	8.1	
Conductivity	0.01	mS/cm	55	51	50	52	52	
Total Dissolved Solids	5	mg/L	42,000	41,000	39,000	39,000	38,000	
Total Suspended Solids	5	mg/L	<5	7	<5	<5	<5	
Turbidity	0.1	NTU	1.4	1.7	1.4	0.6	0.7	
Chlorophyll-a	1	Total µg	2	<1	<1	<1	<1	

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Physical Parameters			Sample No	20-02322-16	20-02322-17	20-02322-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			5/02/2020	5/02/2020	5/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	
pH	0.1	pH units	8.1	7.9	8.1	
Conductivity	0.01	mS/cm	52	1.3	52	
Total Dissolved Solids	5	mg/L	38,000	650	38,000	
Total Suspended Solids	5	mg/L	5	<5	<5	
Turbidity	0.1	NTU	0.6	0.3	0.7	
Chlorophyll-a	1	Total µg	<1	<1	<1	

Biochemical Oxygen Demand			Sample No	20-02322-1	20-02322-2	20-02322-3	20-02322-4	20-02322-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	20-02322-6	20-02322-7	20-02322-8	20-02322-9	20-02322-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	20-02322-11	20-02322-12	20-02322-13	20-02322-14	20-02322-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			4/02/2020	4/02/2020	4/02/2020	5/02/2020	5/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	<5	<5	<5

Biochemical Oxygen Demand			Sample No	20-02322-16	20-02322-17	20-02322-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			5/02/2020	5/02/2020	5/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	
Biochemical Oxygen Demand	5	mg/L	<5	<5	<5	

Subcontracting			Sample No	20-02322-1	20-02322-2	20-02322-3	20-02322-4	20-02322-5
Sample Description			Rocky Point	Locker Island Bottom	Locker Island Top	Locker Point Bottom	Locker Point Top	
Sample Date			4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	
Total Organic Carbon	1	mg/L	1	1	1	1	1	1
Dissolved Organic Carbon	1	mg/L	1	1	1	1	1	1

K+S Salt
Job No: 20-02322

LABORATORY REPORT
Revision: 01

Date: 4/03/20

Subcontracting			Sample No	20-02322-6	20-02322-7	20-02322-8	20-02322-9	20-02322-10
Sample Description			Urala Creek North Channel	Urala Creek North Near Top	Urala Creek North Near Bottom	Urala Creek South Channel	Urala Creek South Off	
Sample Date			4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020	4/02/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	2	1	1	2	1	1
Dissolved Organic Carbon	1	mg/L	2	1	1	2	1	1

Subcontracting			Sample No	20-02322-11	20-02322-12	20-02322-13	20-02322-14	20-02322-15
Sample Description			Urala Creek South Near	Fly Island Top	Fly Island Bottom	Eva Island Top	Eva Island Bottom	
Sample Date			4/02/2020	4/02/2020	4/02/2020	5/02/2020	5/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	<1	1	1	1	1
Dissolved Organic Carbon	1	mg/L	1	<1	1	1	1	1

Subcontracting			Sample No	20-02322-16	20-02322-17	20-02322-18
Sample Description			Tent Island Top	Locker SW	Tent Island Bottom	
Sample Date			5/02/2020	5/02/2020	5/02/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	<1	<1	<1
Dissolved Organic Carbon	1	mg/L	<1	<1	<1	<1

Result Definitions

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting
* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.



APPENDIX C AECOM DEPTH PROFILES



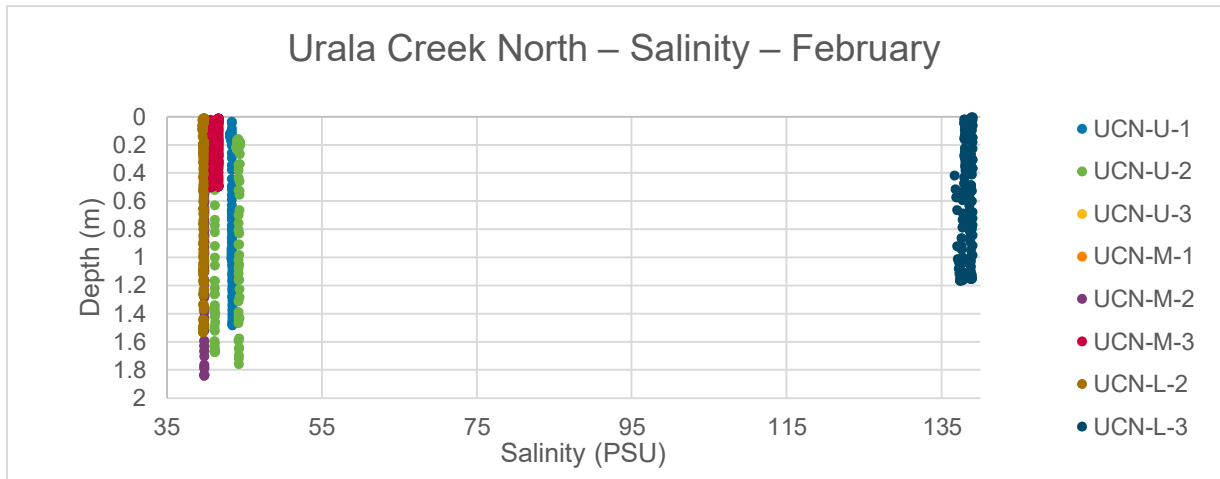


FIGURE 0-1 URALA CREEK NORTH – SALINITY – FEBRUARY

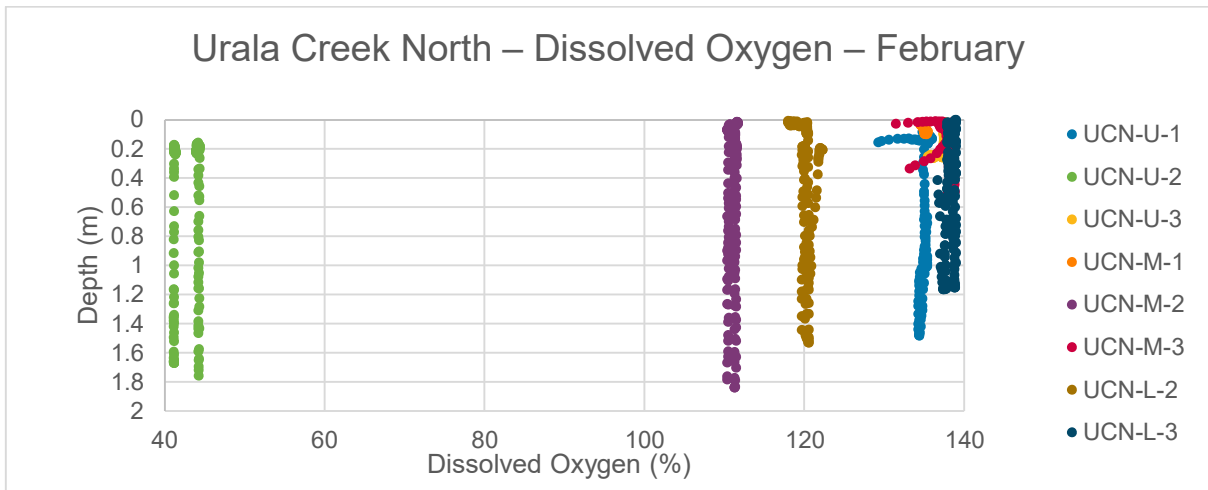


FIGURE 0-2 URALA CREEK NORTH – DISSOLVED OXYGEN – FEBRUARY

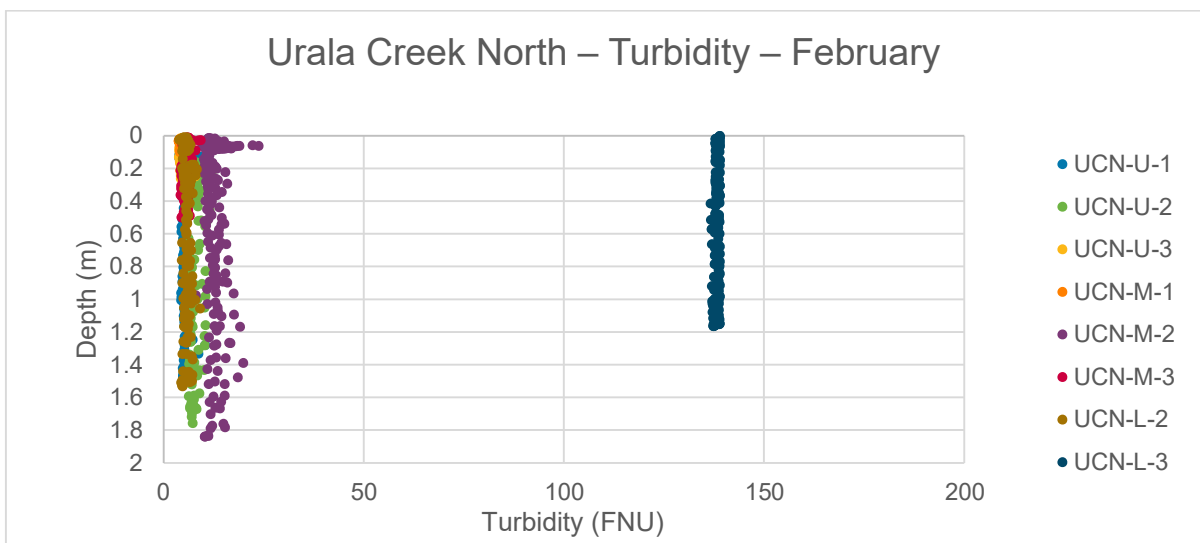


FIGURE 0-3 URALA CREEK NORTH – TURBIDITY – FEBRUARY

5196-10_R02_v04_Marine_Coastal_&_.....

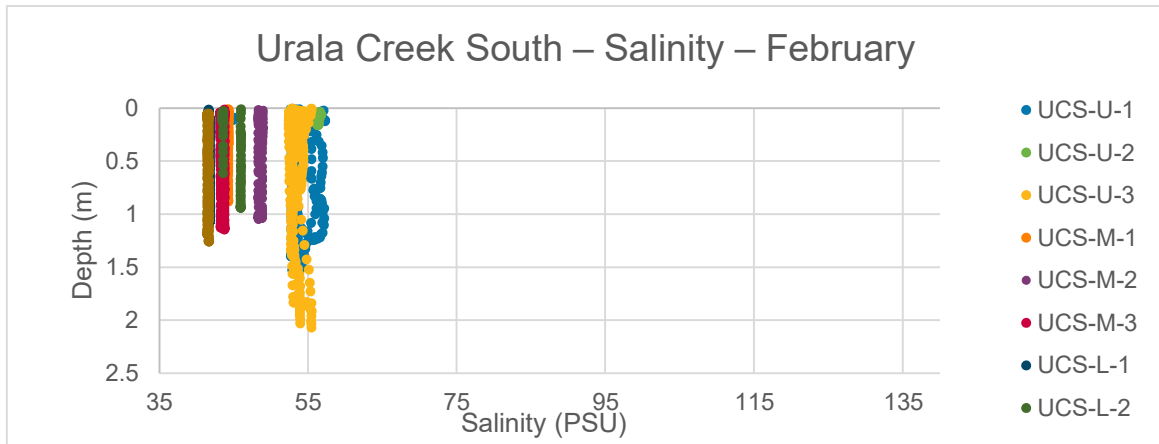


FIGURE 0-4 URALA CREEK SOUTH – SALINITY – FEBRUARY

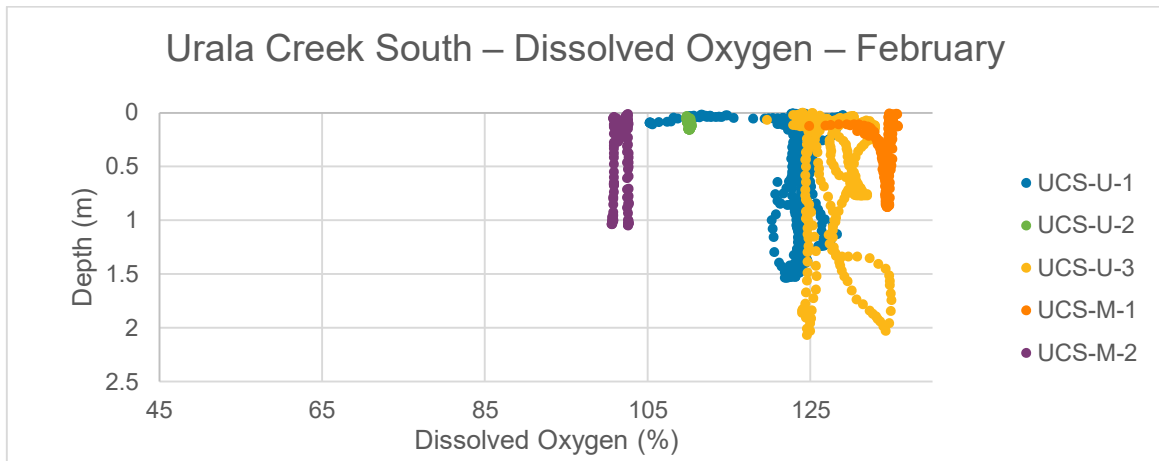


FIGURE 0-5 URALA CREEK SOUTH – DISSOLVED OXYGEN - FEBRUARY

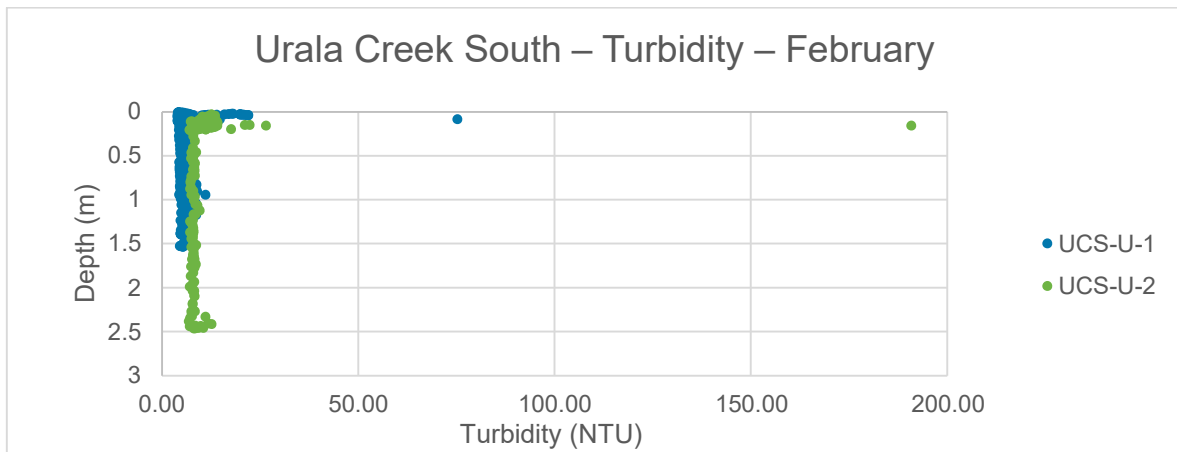


FIGURE 0-6 URALA CREEK SOUTH – TURBIDITY – FEBRUARY

5196-10_R02_v04_Marine_Coastal_&_Surface_Water_Data_Collection_Report

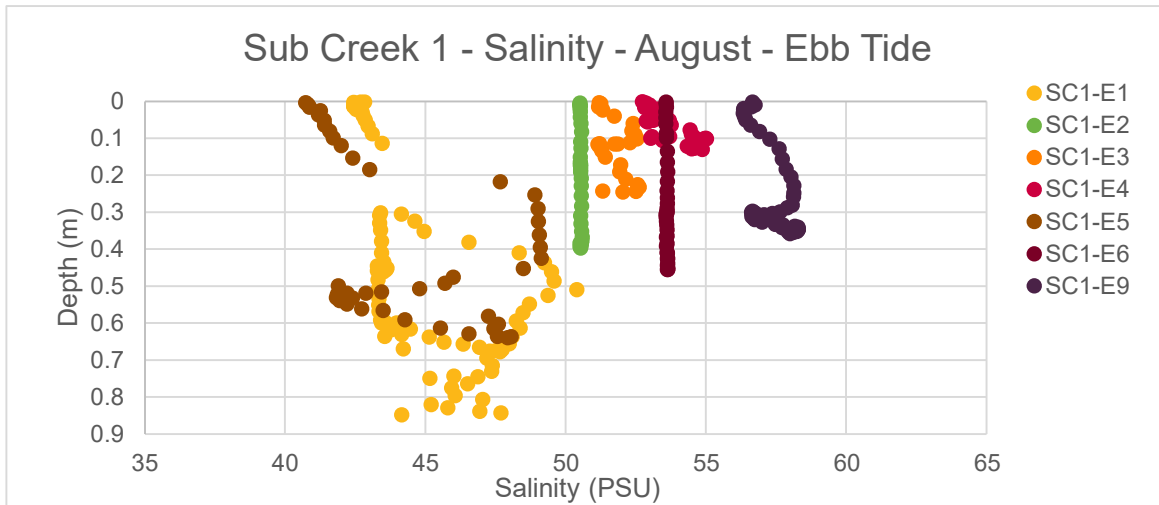


FIGURE 0-7 SUB CREEK 1 – SALINITY AGUST – EBB TIDE

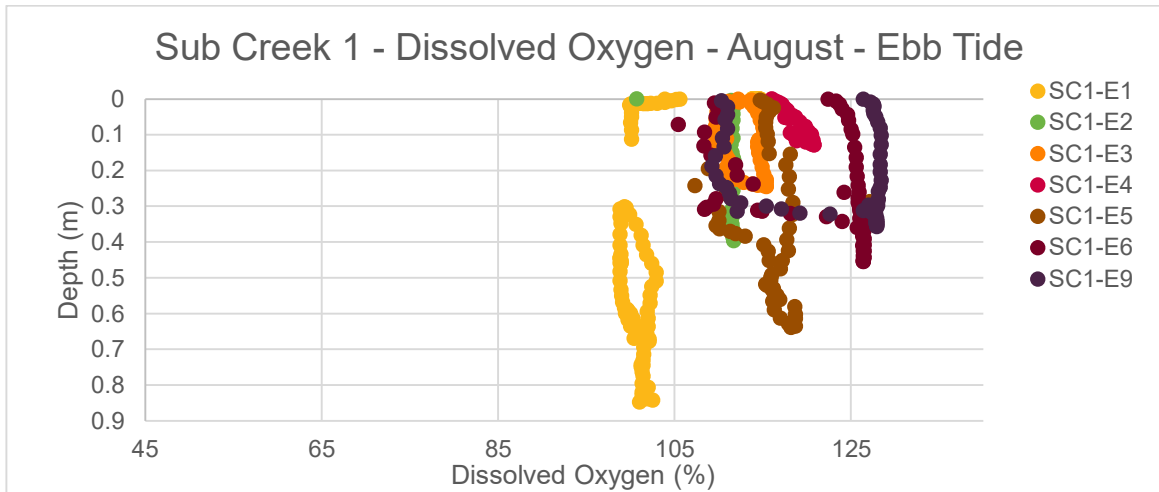


FIGURE 0-8 SUB CREEK 1 – DISSOLVED OXYGEN – AUGUST – EBB TIDE

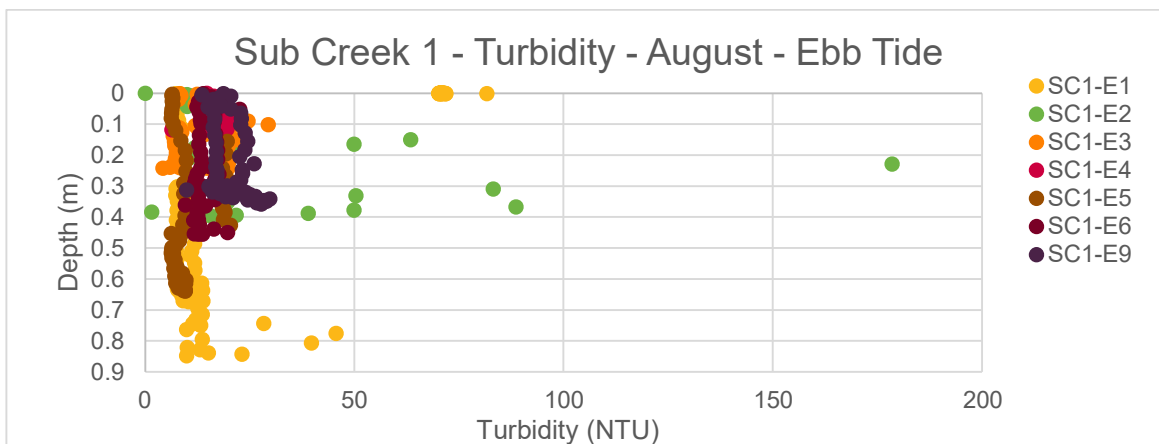


FIGURE 0-9 SUB CREEK 1 – TURBIDITY – AUGUST – EBB TIDE

5196-10_R02_v04_Marine_Coastal_&

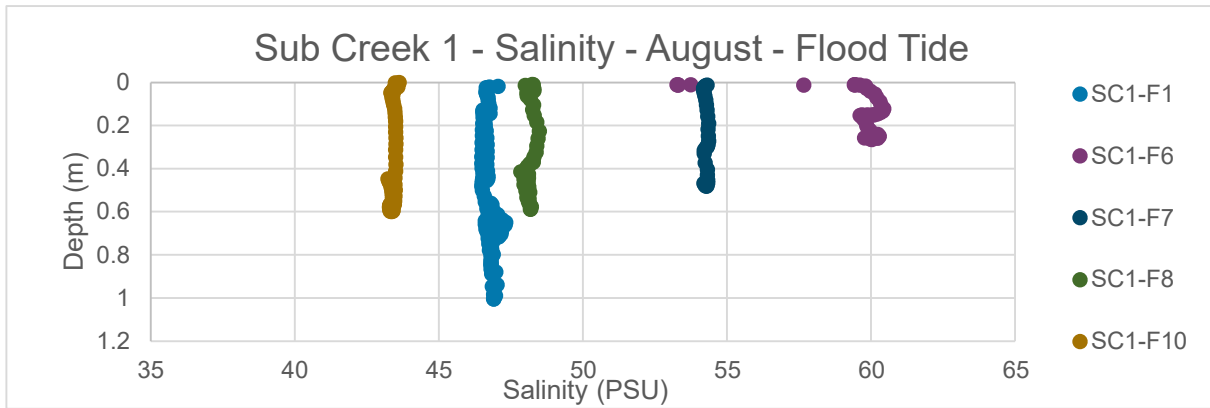


FIGURE 0-10 SUB CREEK 1 – SALINITY – AUGUST – FLOOD TIDE

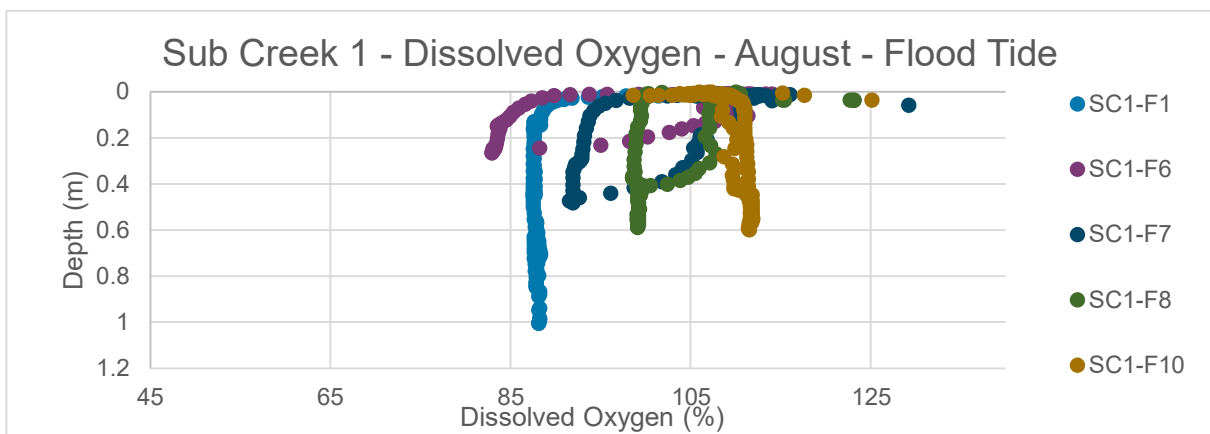


FIGURE 0-11 SUB CREEK 1 – DISSOLVED OXYGEN – AUGUST – FLOOD TIDE

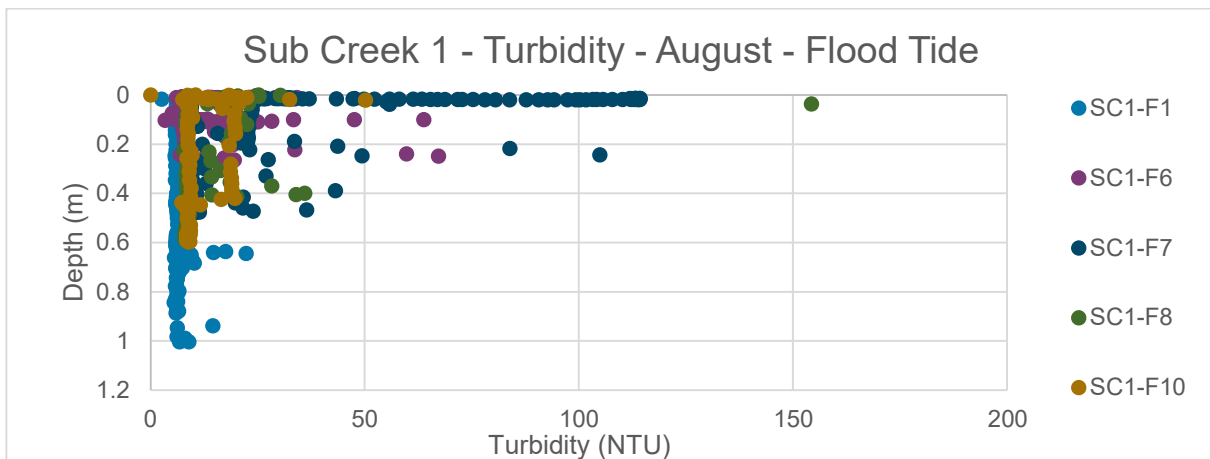


FIGURE 0-12 SUB CREEK 1 – TURBIDITY – AUGUST – FLOOD TIDE

5196-10_R02_v04_Marine_Coastal_&_.....

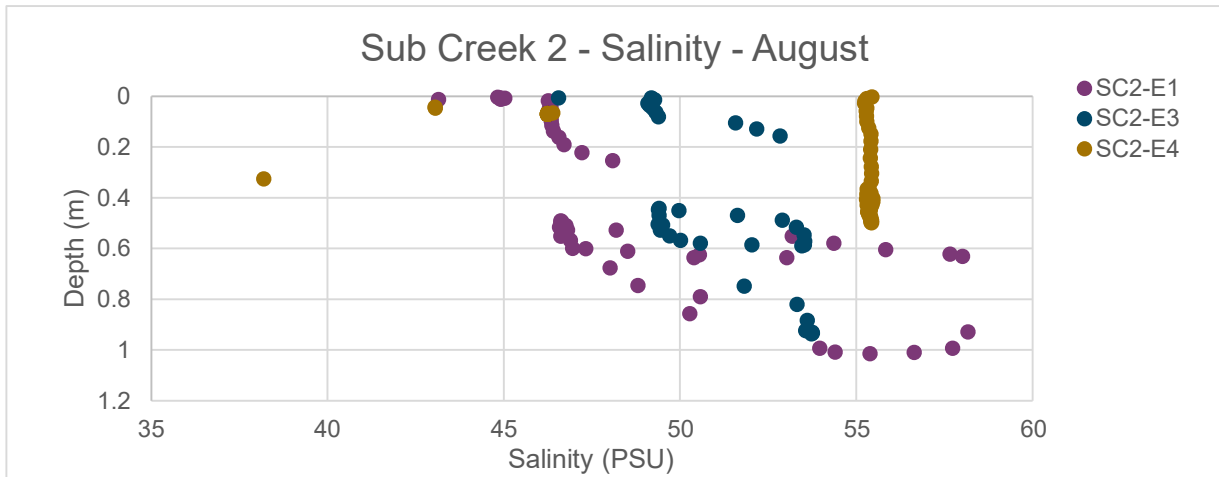


FIGURE 0-13 SUB CREEK 2 – SALINITY – AUGUST – EBB TIDE

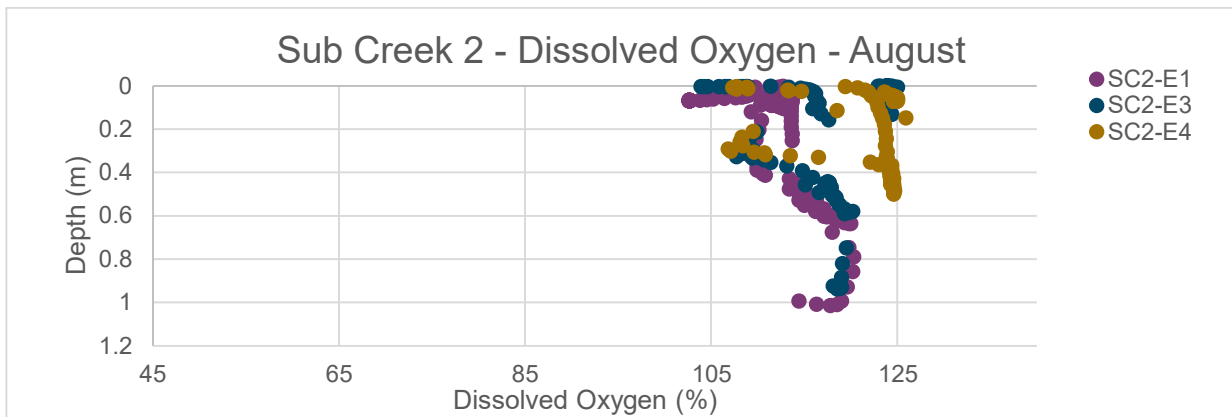


FIGURE 0-14 SUB CREEK 2 – DISSOLVED OXYGEN – AUGUST – EBB TIDE

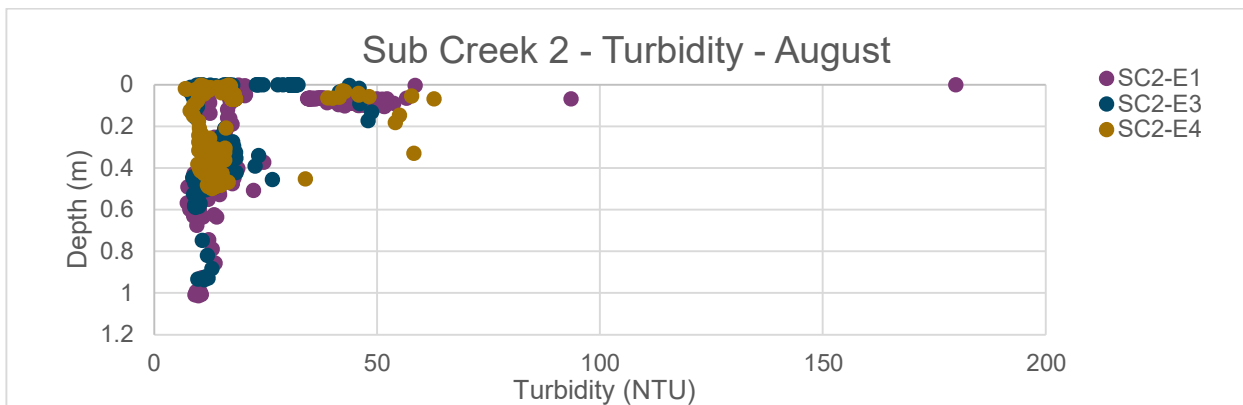


FIGURE 0-15 SUB CREEK 2 – TURBIDITY – AUGUST – EBB TIDE

5196-10_R02_v04_Marine_Coastal_&_.....

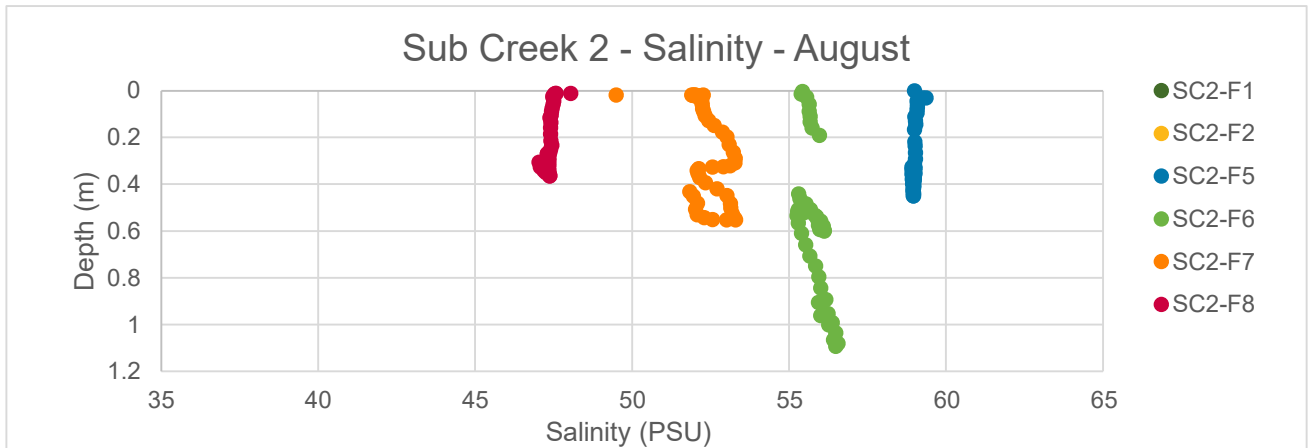


FIGURE 0-16 SUB CREEK 2 – SALINITY – AUGUST – FLOOD TIDE

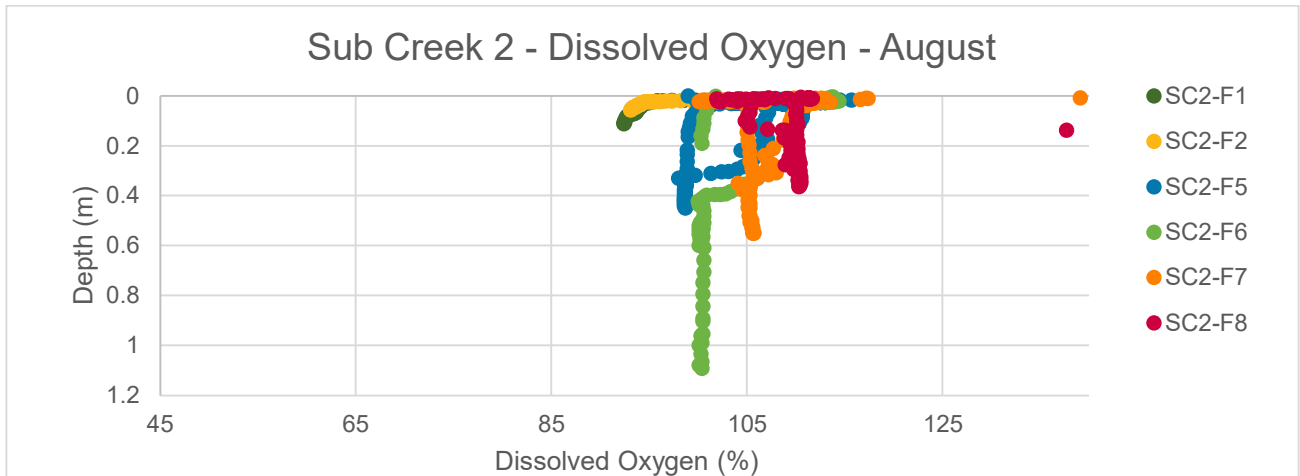


FIGURE 0-17 SUB CREEK 2 – DISSOLVED OXYGEN – AUGUST – FLOOD TIDE

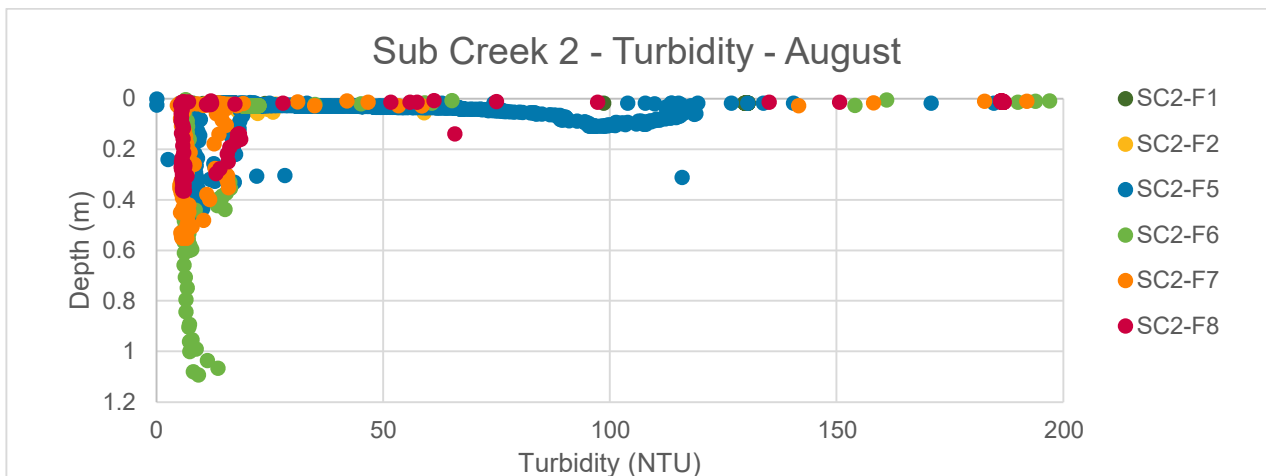


FIGURE 0-18 SUB CREEK 2 – TURBIDITY – AUGUST – FLOOD TIDE

5196-10_R02_v04_Marine_Coastal_&

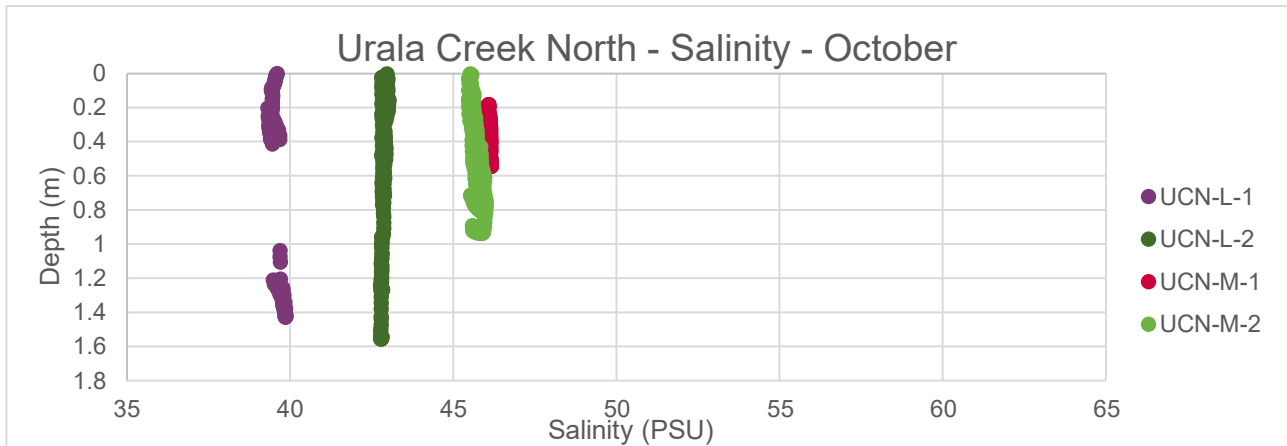


FIGURE 0-19 URALA CREEK NORTH – SALINITY – OCTOBER

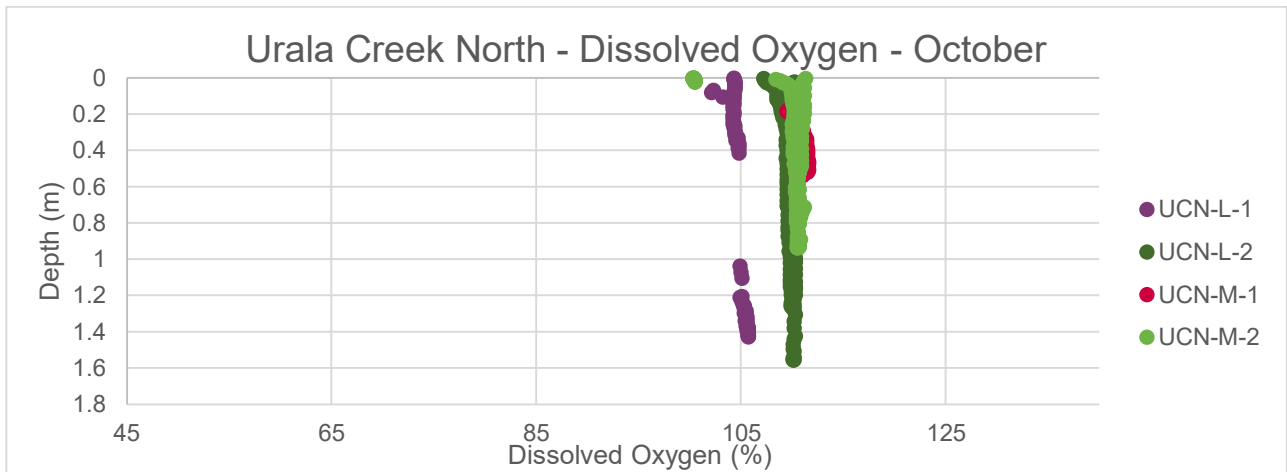


FIGURE 0-20 URALA CREEK NORTH – DISSOLVED OXYGEN – OCTOBER

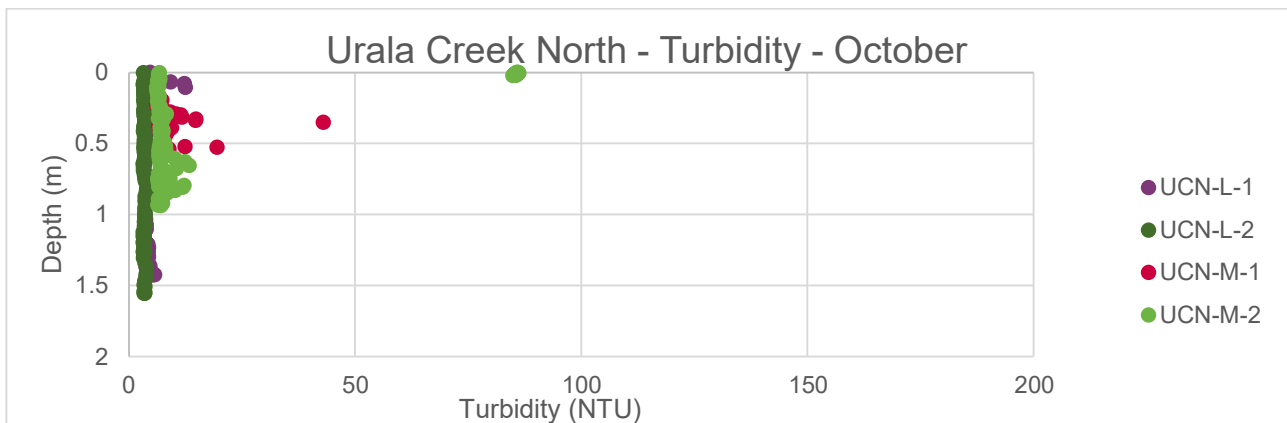


FIGURE 0-21 URALA CREEK NORTH – TURBIDITY - OCTOBER

5196-10_R02_v04_Marine_Coastal_&_Surface_Water_Data_Collection_Report

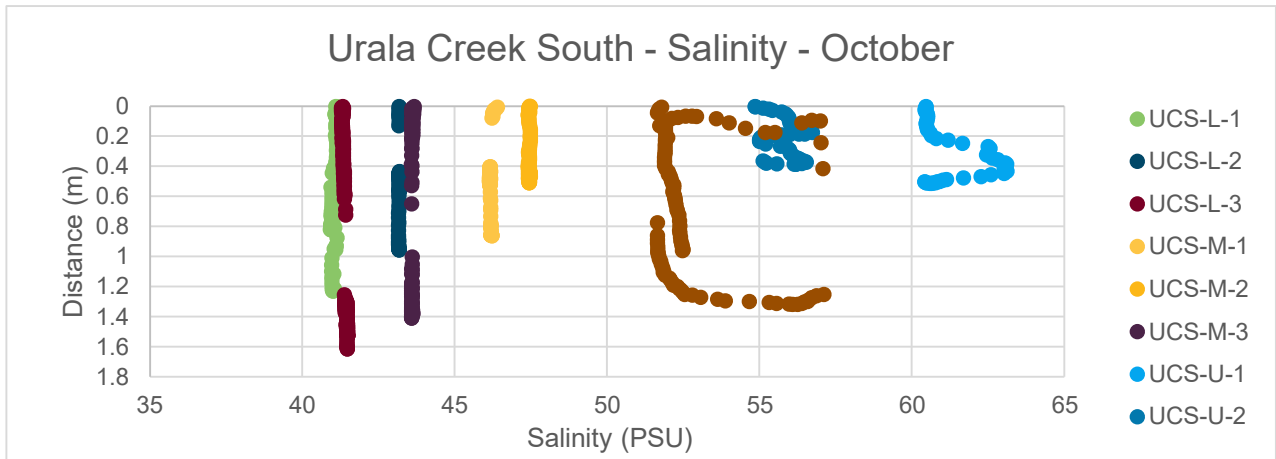


FIGURE 0-22 URALA CREEK SOUTH – SALINITY – OCTOBER

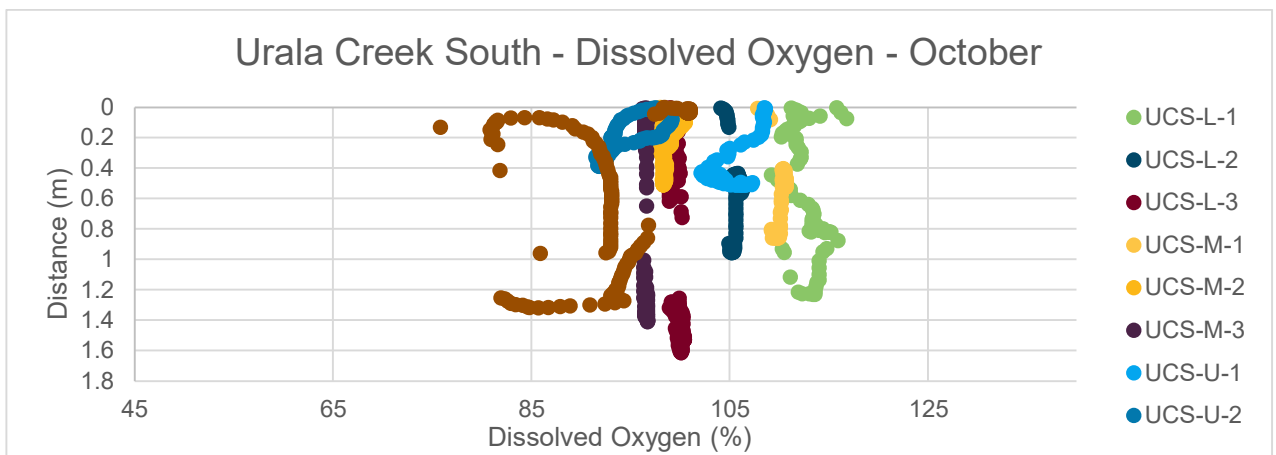


FIGURE 0-23 URALA CREEK SOUTH – DISSOLVED OXYGEN – OCTOBER

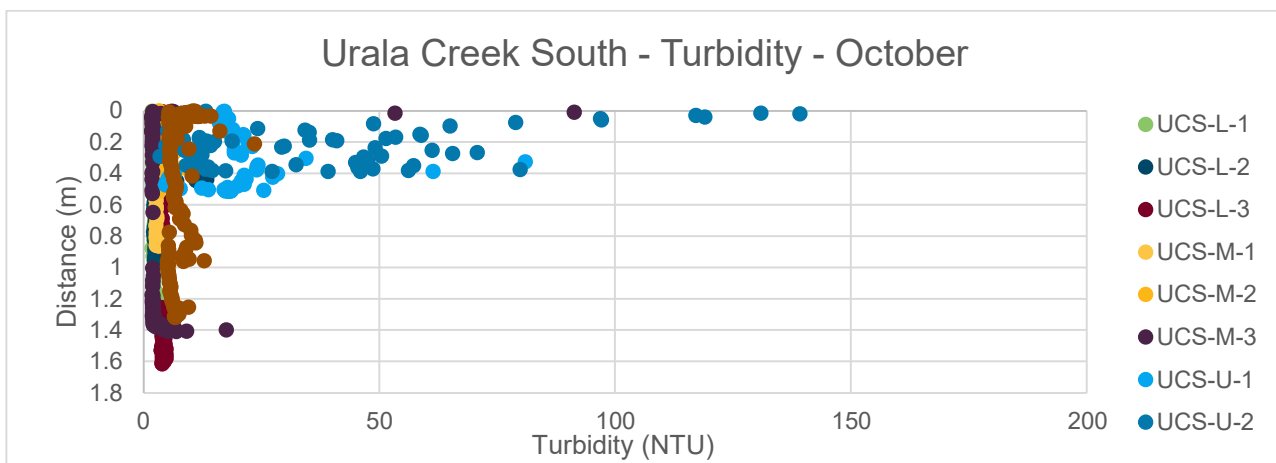


FIGURE 0-24 URALA CREEK SOUTH – TURBIDITY - OCTOBER

5196-10_R02_v04_Marine_Coastal_&



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