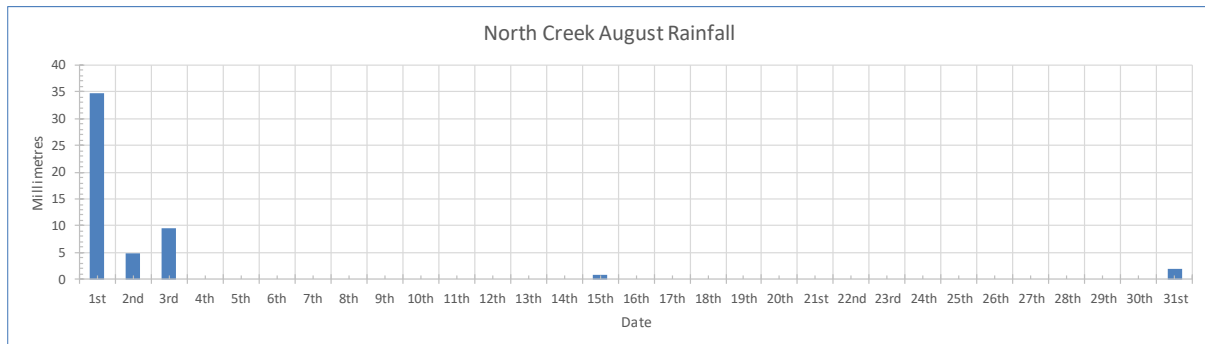


North Creek water quality – August 2019

Data logger located in North Creek near airport.



Interpretation

*Note –The modem stopped uploading on 1st July, the site was checked on 17th July and a new solar panel fitted, however still not uploading, the SIM card was checked and removed on 7th August and replaced on 28th Aug, the site resumed uploading, however no new data was transmitted. The sensor was removed on 2nd Sept but has a firmware problem and will be sent to the manufacture for repair.

- **Dissolved oxygen* (DO)** No data was recorded in August. DO falls at low tide as drains discharge low DO water and increases at high tide as saline water enters the estuary. Levels below 3 mg/L are considered critical to fish, while between 3 and 6 mg/L is considered marginal and above 6 mg/L is optimal. DO is influenced by temperature, rainfall, tidal movement, chemical and biological oxygen demand. DO at North Creek is negatively influenced by runoff from drains following rain.
- **Electrical conductivity (EC).** No data was recorded in August. High EC corresponds to high tide as saline water enters the estuary. Levels below 1.8 ms/cm³ are considered freshwater, while from 1.8 to 4.8 is considered brackish and above 4.8 ms/cm³ saline with seawater equivalent to approximately 60 ms/cm³. EC is influenced by rainfall, runoff, temperature and tidal movement.
- **pH.** No data was recorded in August. Peaks of pH normally occur on high tide with increasing salinity while troughs occur on low tide as acid drains discharge. River water under normal conditions is generally near neutral (pH 7), while saline water moving upstream during high tides will be higher. pH is measured on a logarithmic scale with each consecutive whole number different by a factor of 10.
- **Total dissolved solids (TDS)** is a measure of the combined content of all inorganic and organic dissolved molecular, ionized or suspended micro-granular substances in the water, including minerals, salts or metals measured in parts per thousand (ppt). No data was recorded in August. TDS is highest at high tide as salinity increases and lowest at low tide as freshwater is discharged from North Creek. TDS is influenced by tidal movement, rain and runoff.
- **Density** also called specific gravity (SG) is the ratio of the weight of a sample compared to that of fresh water at +4.0°C. No data was recorded in August. Fresh water is normally close

to 1.0, while sea water is slightly denser at 1.027g/cm^3 , which leads to the formation of salt wedges and acid water is even denser (Sulfuric acid SG = 1.94 g/cm^3). Density varies with temperature with maximum density occurring at $+4.0^\circ\text{C}$, while tides, rainfall, runoff and acid discharges also affect density.

- **Water Temperature.** No data was recorded in August. Water temperature is influenced by season, air temperature, solar radiation, cloud cover, day/night, turbidity, tidal movement and rainfall.
- **Water height.** No data was recorded in August. The highest tide of the month at 1.91 m (0.985 m AHD) occurred on 1th August at 8:47 pm and 9:35 pm on 2nd at Ballina while the peak at the logger was not recorded. The delay in tidal peak along North Creek is caused by restrictions in water entering North Creek due to width and depth, which also reduces the maximum tide height and range. The logger has not yet been surveyed in to the Australian Height Datum (AHD) so all heights are relative. Zero AHD approximates to mean sea level or a 0.925 m tide height and the readings have been adjusted to approximately AHD. Water height can be affected by river level, floods, tides, storm surge and rainfall and to a lesser extent temperature, wind and barometric pressure.
- **Rainfall** recorded during August at the Ballina Airport Automatic Weather Station (AWS) situated 1.8 km to the west of the North Creek logger was 52.0 mm falling over 5 days, which compares to the July rainfall of 74.8 mm over 14 days. The August average for Ballina Airport AWS is 80.5 mm therefore rainfall was below average. Peak August 24-hour rainfall of 34.8 mm was recorded between 9:00 am on 31st July and 9:00 am on 1st August. During August the Tuckean site 4 data logger located 19 km to the SW recorded 30.4 mm over 6 days, while the Rocky Mouth Creek data logger located 37 km to the south-west recorded 19.2 mm over 11 days.