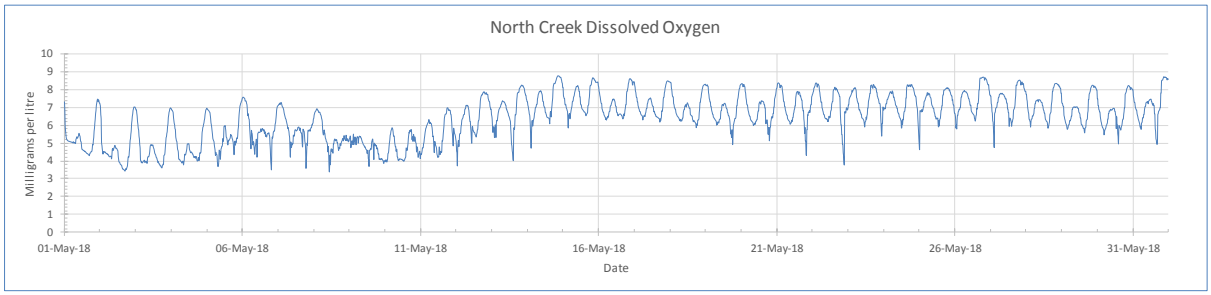
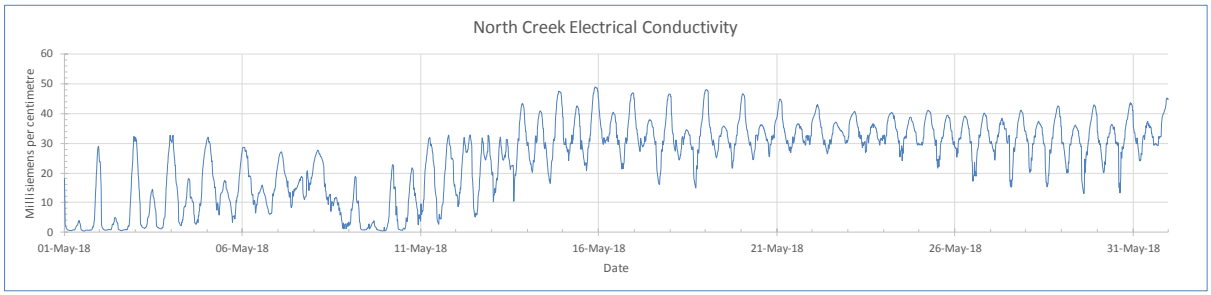
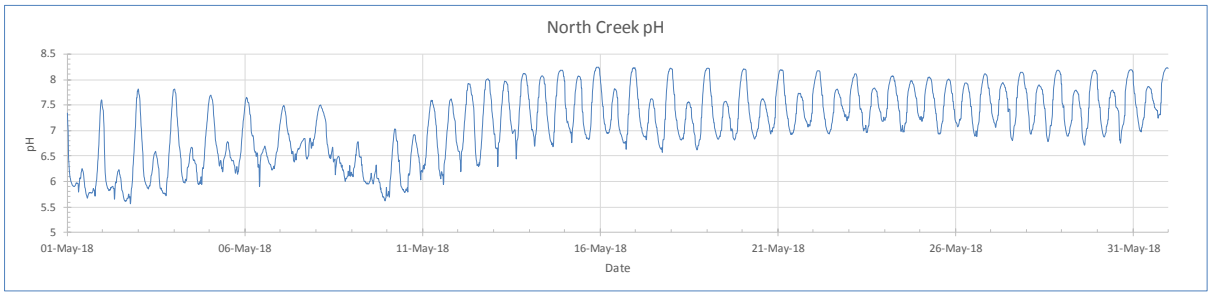
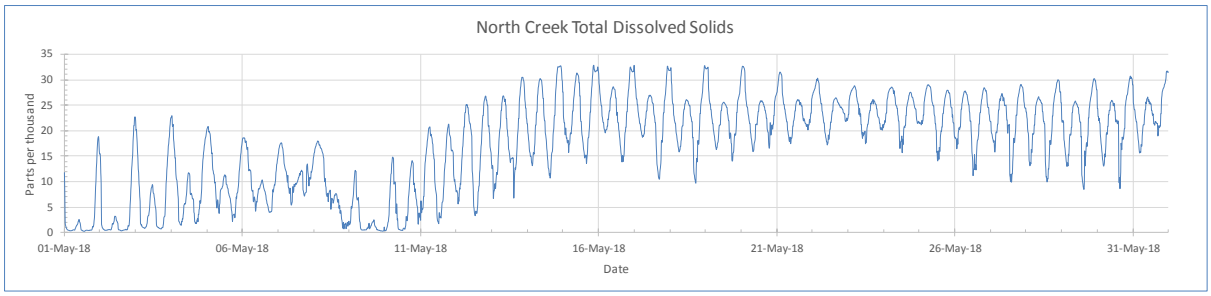
North Creek water quality – May 2018

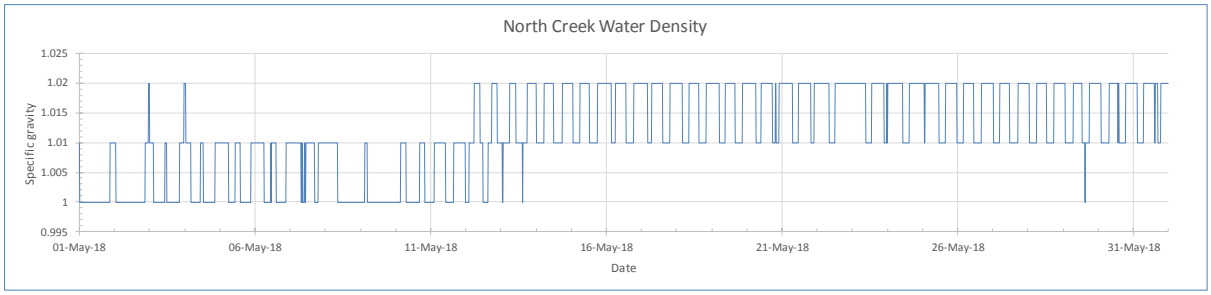
Data logger located in North Creek near airport.

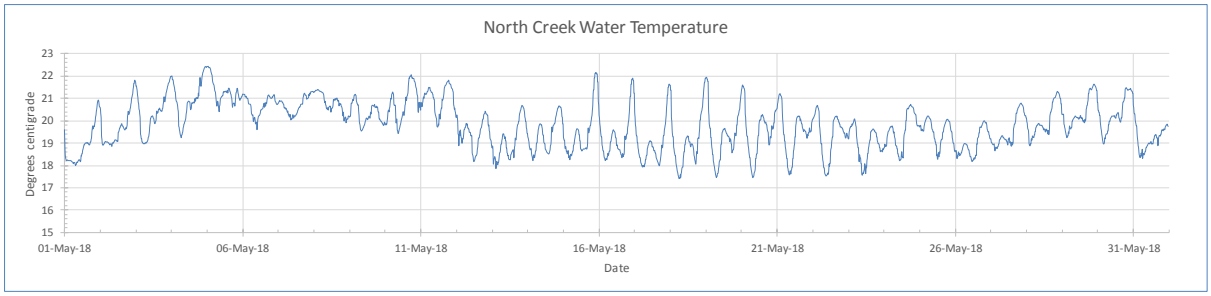


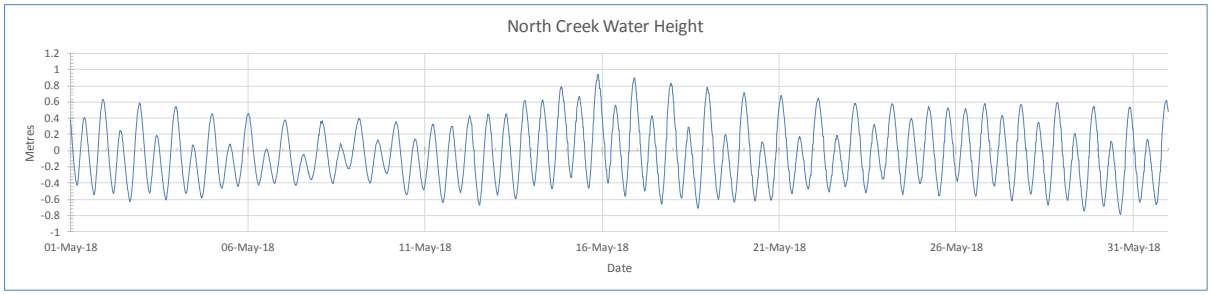


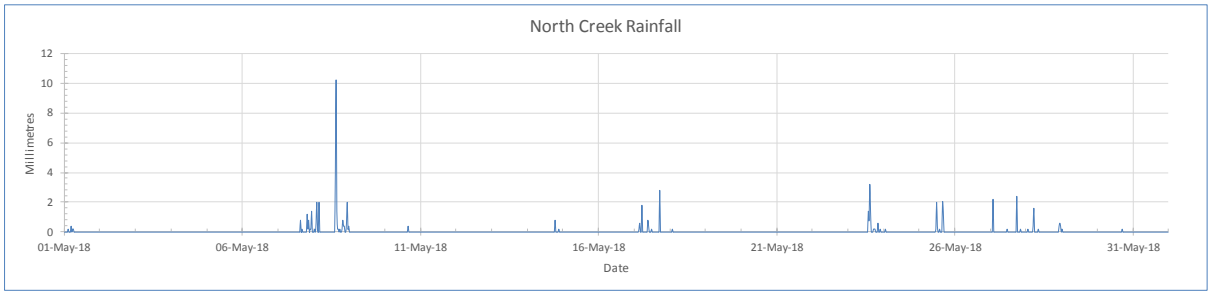












Interpretation

*Note – Regular maintenance resumed on 28th March 2018 however the logger required repair and upgrade and following repairs was reinstalled in North Creek on 23rd April 2018. There is a data delivery problem with EC data above 32 ms and this has been manually corrected.

- **Dissolved oxygen* (DO)** was recorded during May from 3.5 to 8.7mg/L with an average of 6.4 mg/L. 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 and chemical and biological oxygen demand.

- **Electrical conductivity (EC)** for May was recorded between 0.6 and 47.5 ms/cm averaging 24.7 ms/cm. Levels have risen due to lower rainfall and greater tidal influence. Levels below 1.8 ms/cm are considered freshwater, while from 1.8 to 4.8 is considered brackish and above 4.8 ms/cm saline with seawater equivalent to approximately 60 ms/cm. EC is influenced by rainfall, runoff, temperature and tidal movement.

- **pH** for May was recorded between 5.6 and 8.1 with an average of 7.1. 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). TDS was recorded for May between 0.6 and 32.3 ppt averaging 17.1 ppt. TDS is highest on high tide as salinity increases and lowest on 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^{o}C. For May density was recorded between 1.0 and 1.02 with an average of 1.01. 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^{o}C, while tides, rainfall, runoff and acid discharges also affect density.

- **Water temperature** for May was recorded between 17.4 and 21.9^{0}C averaging 19.8 deg C. Water temperature is influenced by season, air temperature, solar radiation, cloud cover, day/night, turbidity, tidal movement and rainfall.

- **Water height** was recorded for May between -0.79 and +0.94 and averaging -0.04m however barnacles within the housing are preventing correct seating of the sensors so the height has been adjusted to approximate AHD. The highest tide of the month at 1.85 m occurred on 17th May at 9.56 pm at the Ballina River entrance while the peak at the logger of 0.83 m was recorded at 10.45pm giving a delay of 49 minutes. 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 May at the Ballina Airport Automatic Weather Station (AWS) situated 1.8 km to the west of North Creek logger was 64.4 mm falling over 14 days, which compares to the April rainfall of 248.4 mm over 20 days. Peak rainfall of 10.2 mm was recorded on the 8th May over 30 minutes between 2:30 pm and 3:00 pm. During May the Tuckean site 4 data logger located 19 km to the SW failed to record until 29th May, however a nearby station recorded 73.4 mm over 13 days, while the Rocky Mouth Creek data logger located 37 km to the south-west recorded 71.2 mm over 25 days.