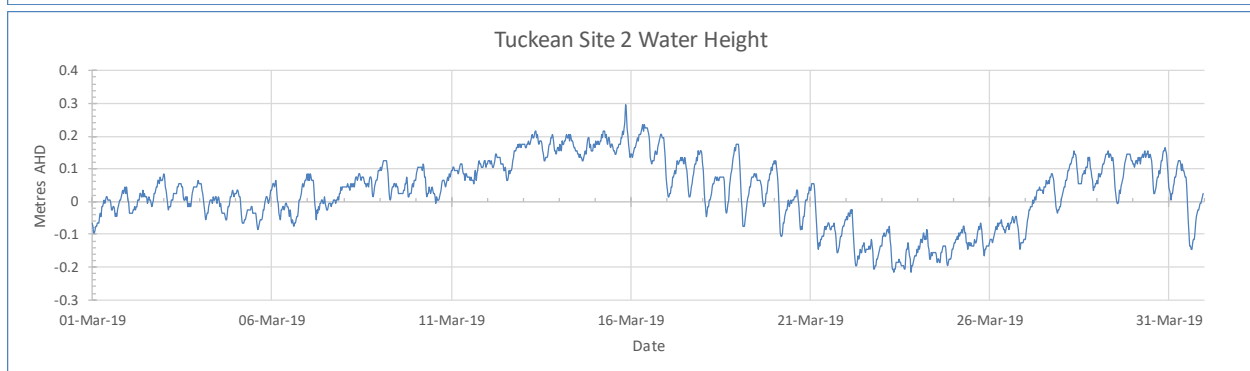
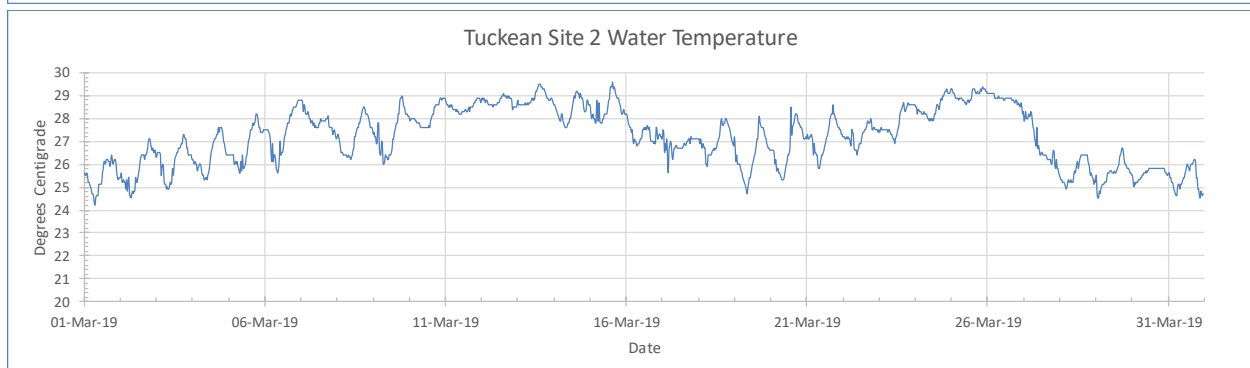
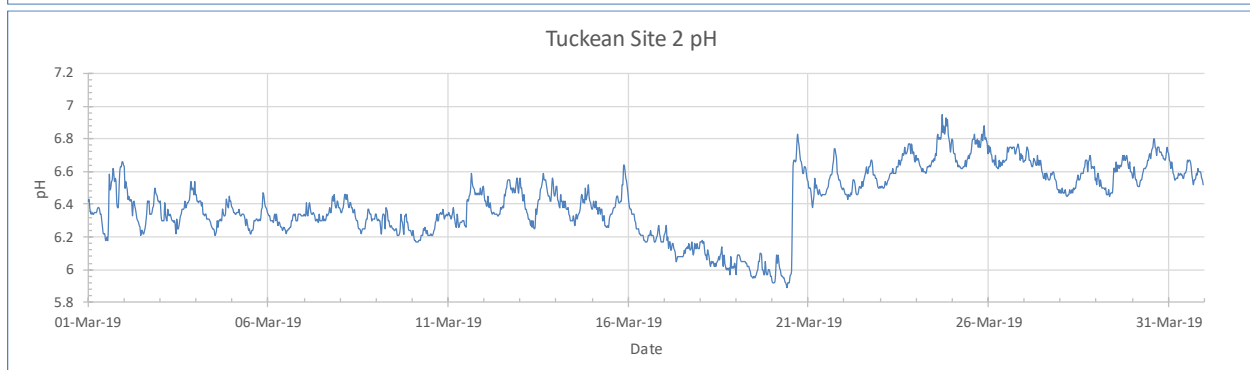
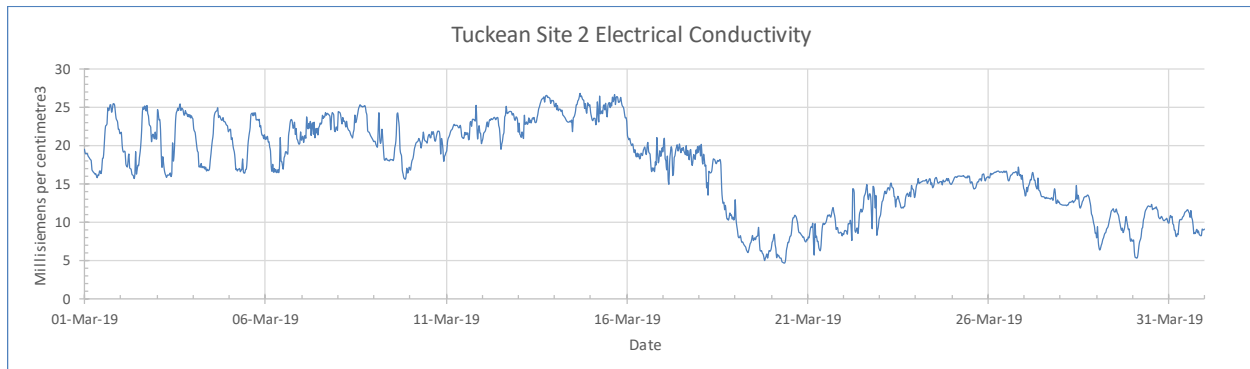
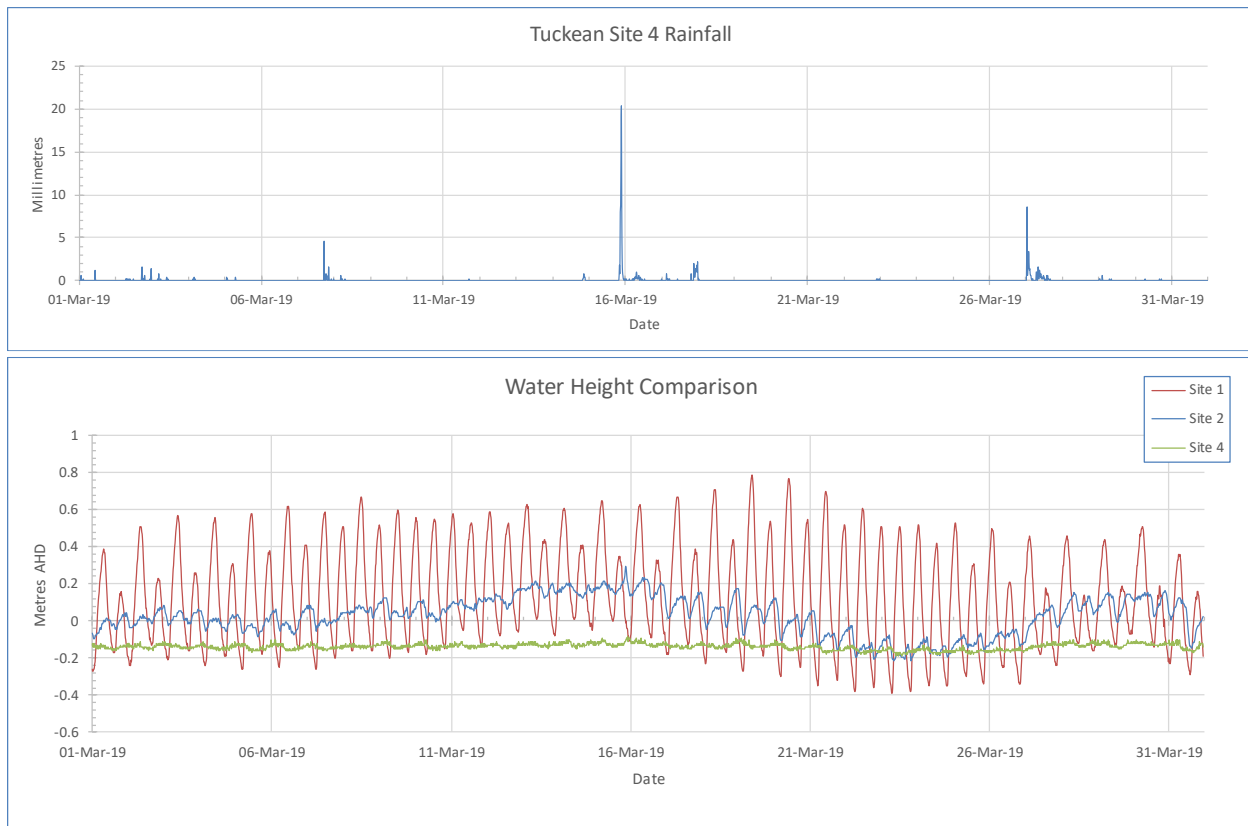


## Tuckean site 2 water quality – March 2019

Data logger located upstream of Bagotville Barrage, Tuckean Swamp, NSW





## Interpretation

The logger was cleaned and calibrated on 20<sup>th</sup> March.

- Electrical conductivity (EC)** was recorded in March between 4.7 and 26.5 ms/cm averaging 17.2 which has fallen by 3.7 compared to the February average of 20.9 ms/cm due to increased rainfall and reduced tidal influence. EC is directly related to salinity and is the inverse of electrical resistance in ohms. Water is considered fresh if below 1.8 ms/cm, brackish from 1.8 – 4.8 and saline above 4.8 with seawater approximately 60 ms/cm.
- pH** was recorded in March between 5.9 and 6.9 with an average of 6.4 which is equal the February average of 6.4. On the pH scale neutral is at pH 7 and for every consecutive whole number below 7 acidity increases by ten times on a logarithmic scale. The Tuckean Swamp is an acid sulfate environment therefore pH is affected by surface and groundwater level, drainage, rainfall, runoff and tidal exchange.
- Water temperature** was recorded in March between 24.2 and 29.4 deg C averaging 27.2 which has fallen by 0.3 compared to the February average of 27.5°C due to seasonal change. Water temperature normally peaks in the late afternoon as air temperature and solar radiation decreases. Temperature variations can be caused by a combination of factors including solar radiation, air temperature, tidal exchange, day /night, riparian shade, turbidity and rainfall.
- Water level** recorded in March ranged between -0.22 m and +0.28 m giving a range of 0.50 m and averaging +0.03 m which has risen by 0.07 m compared to the February average of -0.04 m due

to increased rainfall. Levels are yet to be surveyed in to Australian Height Datum (AHD). Water height at site 2 fluctuates with tides, barrage leakage, degree of sluice gate opening, river height, rainfall in the catchment and to a lesser extent temperature, wind and barometric pressure.

- **Rainfall:** In March the site 4 data logger situated 4 km to the north recorded 166.6 mm over 17 days which compares to 79.0 mm recorded over 19 day in February. Peak 15-minute rainfall of 20.4 mm was recorded between 9:00 pm and 9:15 pm on 15<sup>th</sup> March during a thunder storm. The March 33-year average for this location is 220.9 mm therefore rainfall is below average. During March the Rocky Mouth Creek data logger located 19 km to the SSW recorded 184.2 mm over 20 days, while the Ballina AWS located 19 km to the NE recorded 139.2 mm over 18 days.

- **Water height comparison**

The March site 2 average was 0.1 m lower than the site 1 average of + 0.13 m and 0.17 m higher than the site 4 average of -0.14 m. Due to restricted water entry at the barrage sluice gates maximum daily tidal variation at site 2 was 0.25 m compared to 1.04 m at site 1. This compares to the maximum daily tidal variation at site 4, 6.6 km upstream of 0.06 m caused by restrictions in the drains. The water height at site 4 approximates average low tide level at site 1 indicating drainage has ceased. Although rainfall has increased in March groundwater levels remain low due to low summer rainfall and transpiration and were measured at 0.56 m below ground on a revegetated former acid scald 640 metres SE from site 4 while along Tuckean Island Road 1.3 km west from Henderson's drain, water levels were 1.5 m below ground. Low groundwater on the swamp exposes acid sulfate soils which oxidise to form sulfuric acid. If the soil becomes saturated from heavy rainfall, mobilised acid can be washed into drains resulting in an acid event capable of killing fish and causing red spot disease.