

Factsheet 1: Getting Wise

Understanding the processes driving water quality in Avoca Lagoon

An innovative water quality logger system (BEATRICE_2020) has been launched to help understand the reasons behind the poor ecological health of Avoca Lagoon. The initiative is part of a new study commissioned by Central Coast Council involving scientists from the Department of Planning, Industry and Environment and Southern Cross University. BEATRICE aims to lift the lid on the complexities of water movements and chemical interactions that are driving poor water quality conditions in Avoca lagoon.

What will BEATRICE investigate?

BEATRICE will help us understand how water quality in Avoca lagoon changes over time, from the surface all the way to the water sitting at the bottom. This study is an integral part of the Avoca Lagoon Process Study which will guide Council in how to best prioritise efforts to improve the ecological health of Avoca Lagoon.

Meet BEATRICE

BEATRICE is a multi-depth water quality monitoring device that provides a real-time readout of the 'heartbeat' of Avoca Lagoon. BEATRICE looks like a big, lazy yellow buoy, but all the while she is busy sampling the water from the surface to the deepest depths and beaming the data back for scientists to analyse in real-time. These data will help scientists better understand the water quality dynamics of the lagoon and help to refine their understanding of the system, improving their ability to advise on ways of improving ecological health.

Why multiple depths?

Water quality underpins the ecology of coastal lagoons and estuaries. In relatively sheltered systems like Avoca Lagoon, the water quality can vary markedly with depth due to physical, chemical and biological influences, giving rise to the layering of water quality characteristics known as 'stratification'. Just like when oil sits on top of water, layers can also form based on differences in salinity, temperature, oxygen or nutrients. Stratification has an important influence on how the lagoon processes pollutants from the surrounding urban areas. BEATRICE helps understand this by sipping water from multiple depths in the water column, allowing us to monitor what happens in response to rainfall, drought and tides. She will alert scientists when the lagoon has separated into layers and will prompt the team to head out to take extra water samples by hand to help them understand the impact of this layering on the interaction between sediments and nutrients in the lagoon.

What will BEATRICE measure?

The water quality logger will take a few important measurements to understand the characteristics of Avoca Lagoon:

1. **Stratification (water layers):** A measure of the layers of water in the lagoon from top to bottom
2. **Dissolved Oxygen:** How much oxygen is in the water
3. **Turbidity:** How clear or murky the water is and how far down light can reach in the water
4. **Salinity:** A measure of saltiness of the water
5. **pH:** How acidic the water is
6. **Temperature:** How cool or warm the water is throughout the day and night
7. **Chlorophyll a:** A measure of photosynthesis and indicator of high nutrient loads
8. **Phycocyanin:** A measure of potentially harmful blue green algae (cyanobacteria)
9. **Coloured Dissolved Organic Matter:** How much organic matter is in the water column

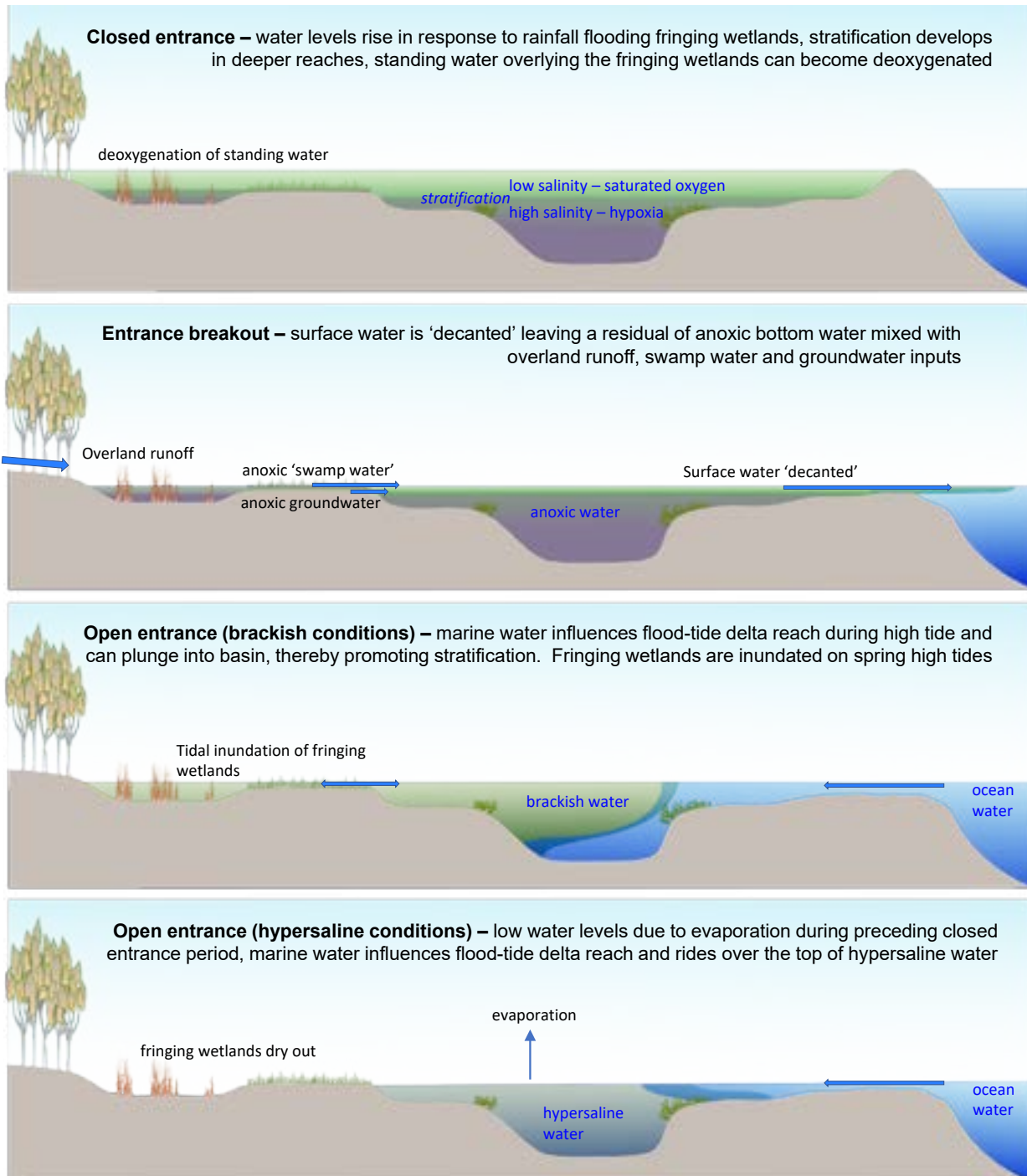
It is anticipated that the logger will remain in place for 12 months to enable enough data to be collected over a range of weather and opening conditions. More detail on the relevance of these parameters is given below.



You can check out what BEATRICE is measuring [here](#)

How does the water in Avoca Lagoon change under different entrance conditions?

The diagrams below explain the water conditions in Avoca Lagoon under different entrance opening scenarios.



For more information on the study contact Central Coast Council or to learn more about the ecological health of our estuaries lagoons and wetlands visit:

yourvoiceourcoast.com/waterways#tab-open-coast-and-coastal-lagoons